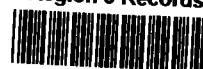


GH&R FOUNDRY SITE

REMOVAL ACTION WORK PLAN

EPA Region 5 Records Ctr.



247425

24 April 1997

Prepared for:

Foundry Sales & Supply, Inc.

Prepared by:

**Roy F. Weston, Inc.
Cincinnati, Ohio**

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- A Sampling and Analysis Plan
- B Site-Specific Health and Safety Plan

1

INTRODUCTION

This Work Plan describes the removal actions to be performed at the GH&R Foundry property located at 400 Detrick Street in Dayton, Ohio. These removal actions have been voluntarily entered into by Foundry Sales & Supply Inc., as formalized in an Administrative Order of Consent (AOC) with U.S. EPA Region V. This Work Plan details the steps to be used to identify, segregate, remove, and dispose of the following hazardous substances as required by and identified in the AOC:

- Asbestos-containing materials
- Polychlorinated biphenyl (PCB) liquids
- Contents of on-site underground storage tanks (USTs)
- Secondary site contaminants in the Plant G structure

The removal of these items will either eliminate any imminent or substantial endangerment to public health, welfare, or the environment, or mitigate any potential release from the site.

1.1

Site Location

The GH&R Foundry property is an 11.8-acre site located at 400 Detrick Street in Dayton, Montgomery County, Ohio (see Figure 1). The site is bordered on the south by the Mad River, and to the east by the B&O railway. Immediately west of the property is a building owned by the Digitron Corporation. The site is bordered to the north by Route 4. A site plan is shown on Figure 2.

1.2

Site History

The GH&R Foundry was active for over 35 years, producing grey iron castings until operations ceased in 1983. The 11.8-acre property contained a 190,000 square foot (ft²) main building (Plant H), a 86,000 ft² core manufacturing building (Plant G), and a 5,700 ft² office building.

After 1983, the foundry stood vacant until it was purchased in 1988 from Amcast Industrial Corporation by Ohio Industrial Trading Company in a joint venture between Foundry Sales and Supply, Inc. and John Paul Enterprises.

The foundry equipment was removed for remanufacturing and resale, and the buildings were partially razed with the resulting scrap metal removed and sold for salvage.

Active salvage and cleanup activities ceased in 1995, leaving the site with partially demolished buildings, and partially segregated demolition debris.

1.3

Regulatory Background

In June of 1991, Ohio EPA issued a citation to GH&R Foundry for violations of TSCA recordkeeping, storage and marking requirements for PCB transformers, equipment and drums of oil stored on site.

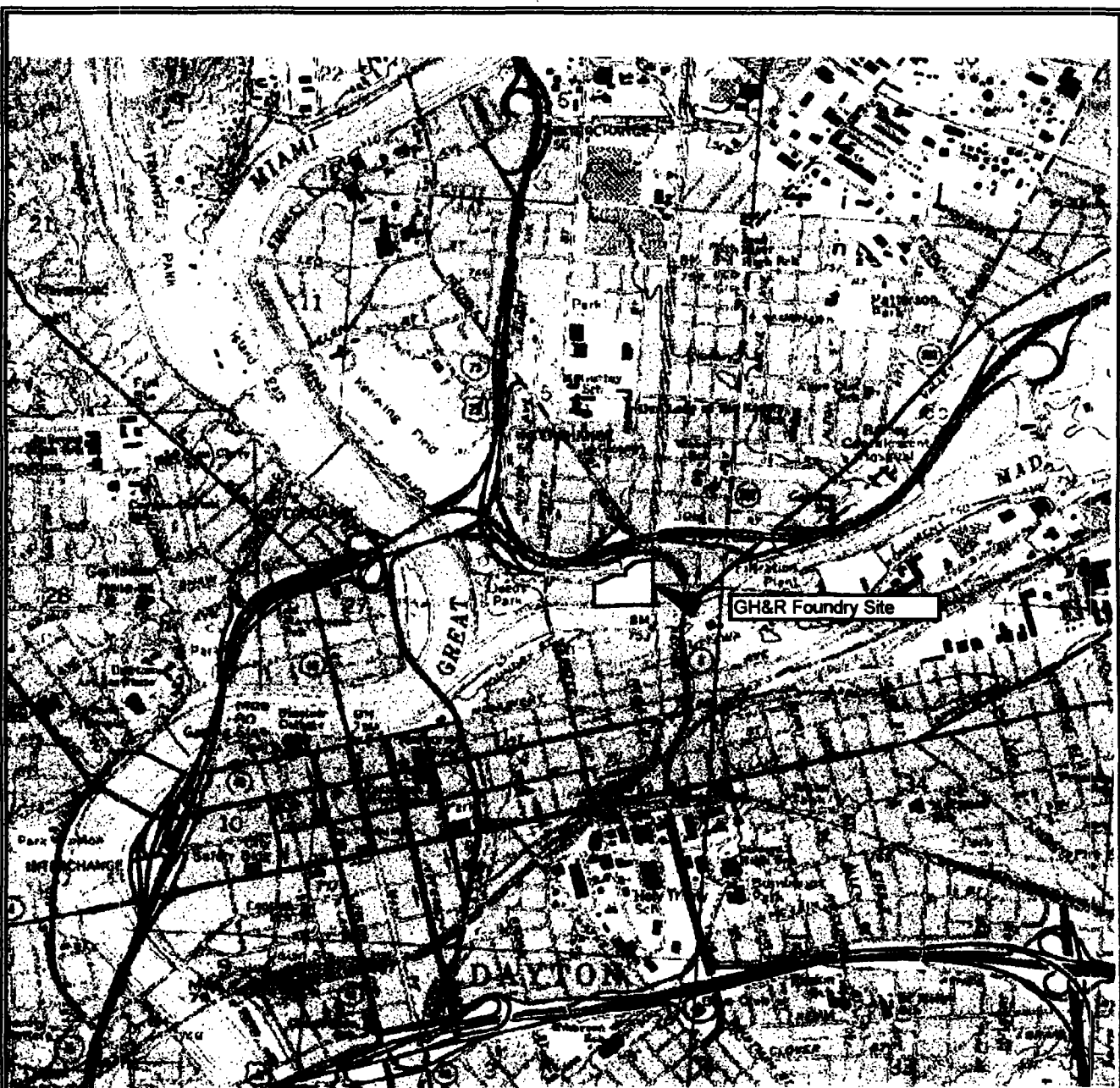
At the request of the Ohio EPA, the US EPA performed a site removal assessment investigation of the property during the months of April and October 1996. This investigation resulted in the identification of chemical contaminants in soil, sediment, and liquid samples taken from the property.

A complaint was filed in May of 1996 by U.S. EPA citing 20 TSCA violations at the site.

In September, 1996, U.S. EPA sent a letter to the property owners and others, serving a general notice of potential liability. This notification declared U.S. EPA's intention to spend public funds to investigate and control documented releases at the site pursuant to Sections 106 and 107 of CERCLA, unless U.S. EPA determines that such action will be done properly by a responsible party or parties. A notice of violation was issued in October of 1996 by Ohio EPA citing four violations of the State Cessation of Regulated Operations (CRO) Program.

When Foundry Sales and Supply volunteered to address EPA's concerns and resume cleanup at the site, U.S. EPA prepared an AOC which Foundry Sales and Supply agreed to and executed on 21 February 1997.

The AOC requires performance of removal actions at the site by Foundry Sales and Supply with the oversight of an EPA On Scene Coordinator (OSC). Removal actions addressed in this Work Plan are those specifically directed in the AOC.



**GH&R Foundry
Dayton, Ohio**

Site Location

Figure 1



Scale:
Not to Scale



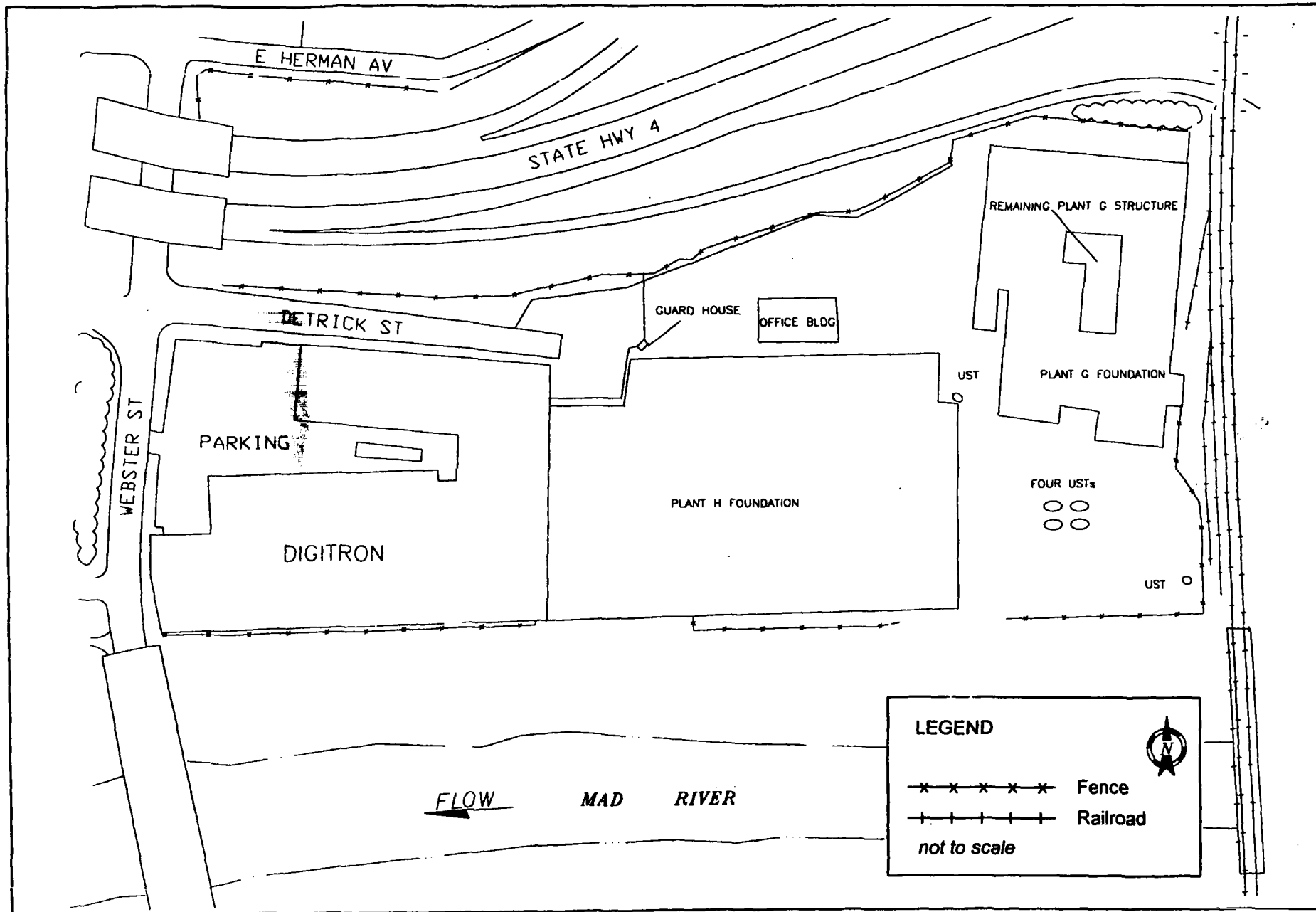


Figure 2 - Site Plan

SCOPE OF WORK

The AOC requires that immediate actions be taken to mitigate the potential threats to human health and welfare and potential risks to the environment. This process requires preparation of a work plan outlining site-specific remediation activities, sampling and analysis details, and a health and safety program that will be instituted throughout the removal action process.

The Sampling and Analysis Plan (SAP) and the Health and Safety Plan (HASP) are included as Appendices A and B, respectively. This section of the Work Plan outlines the activities necessary to secure the site, and to identify and remove the hazardous materials at the former GH&R Foundry specified in the AOC.

2.1 Access Control

Security measures have been implemented to minimize access to the site, which will protect the local population and protect the site against further environmental damage. These measures will eliminate exposure pathways and resulting risks and hazards commonly associated with trespassers.

2.1.1 Fence Installation

A seven-foot security fence with three-strand barbed wire was erected at the Detrick Road site access in February 1997 by Security Fence Group, Inc. This action repaired and supplemented the existing gate, personnel accessways, and fencing that was used while the foundry was in operation.

Security Fence Group, Inc. has also installed a six-foot security fence around the partially razed core manufacturing building (Plant G). This fence discourages trespassers and thus general public access to the physical hazards of the building. The fencing will also eliminate general public exposure to the potential chemical hazards associated with the electrical transformers and drums that have been staged at this until they can be removed.

2.1.2 Building Lock Down

The former office building, which contains asbestos fireproofing, electrical switch gears, and other industrial equipment, has been secured from unauthorized access. Prior to final building lock down, a Merchant's Security representative walked the entire building to verify that there were no inhabitants. The south-facing overhead door has been equipped with new dead-bolt locking devices to hold the door securely closed. Personnel

2.1.3

Warning signs have been placed at 14 key locations around the perimeter of the site. A sample of the sign is shown in Figure 3. These signs will be placed on the interior fencing around Plant G as well as at several locations on the office building.

Figure 3

Sample Warning Sign



2.1.4

Security Surveillance

A private security firm, Merchants Security, has been retained to provide surveillance of the site during the course of the removal actions. Armed security guards are patrolling the grounds at not more than every 2-hour interval between 6 p.m. and 6 a.m. on weekdays and around the clock on weekends and holidays, and will remove any unauthorized personnel found inside the site perimeter. Trespassers will be transferred to the custody of the Dayton City Police Department.

2.2

Removal Actions

WESTON performed a visual inspection of the property and addressed the immediate need of securing the site. Following installation of security fencing around Plant G, demolition debris was removed by a front-end loader to provide access to the remaining closed room in Plant G (referenced herein as Room G).

An inspection of Room G in February 1997 by WESTON revealed as many as 50 drums (all appeared to be labeled as containing PCBs), approximately 50 capacitors (all with PCB labels), and 75 to 100 plastic bags labeled as containing asbestos-containing material (ACM).

In addition to the electrical equipment stored on the ground inside former Plant G, it is likely that some electrical equipment remains on the second story of this building. Before the second story was inspected, additional safety precautions were taken to eliminate the immediate physical hazards at former Plant G. Inspection of the second story and removal of dangerously-located debris was conducted using a manlift. Five transformers were observed on the second floor of Plant G, and will be included in the removal action. Two of the five transformers were labeled as containing less than 50 ppm PCB. No PCB labeling was observed on the other three transformers. Visual inspection confirmed that no other tanks or containers were present on the second floor of Plant G.

WESTON will hold a site-work contractors' pre-bid meeting to allow prospective licensed and certified hazardous waste management firms to view the waste materials in order to provide quotations for disposal services. Following selection of the disposal facility(s) by WESTON, the names and appropriate credentials of the selected facility(s) will be provided to U.S. EPA.

Field sampling and removal activities will be planned and performed in such a manner as to prevent migration of potential chemical contaminants from the site. Airborne transport of asbestos or PCB-laden dusts will be avoided through institution of dust suppression methods if site activities result in generation of greater than 5 mg/m³ respirable dust. All debris and/or waste materials in trucks and/or rolloffs leaving the site will be covered or sealed prior to departure. The tires of vehicles traveling onsite during removal operations will be rinsed free of dirt and potential chemical contaminants prior to leaving the site. Rinsate will be collected and tested for PCBs, and will be disposed of properly. Surface and ground water will be protected during sampling and removal actions through the use of proper waste handling and management techniques. Staging areas will be prepared for drums and transformers awaiting processing and disposal. These areas will be constructed in order to provide secondary

containment for any liquids or rinsates which may leak or spill during disposal preparation activities. Any liquids which may accumulate in these areas will be tested for proper disposal action. Regulated wastes will be removed by certified, experienced transporters, and will be disposed of in accordance with all federal, state and local regulations.

2.2.1

Underground Storage Tanks

According to facility drawings and previous reports, six underground storage tanks (USTs) are located at the site. These USTs have reportedly been registered with the State Fire Marshal Bureau of Underground Storage Tank Regulations (BUSTR). Each UST is reported to have contained either fuel oil, core oil, or kerosene. It is suspected that PCB-laden fluids may have been stored in one or more of these tanks.

Partial demolition of buildings has obscured UST locations. Facility drawings, previous reports, and knowledge of the site will be used as aids in determining the exact location of UST fill pipes. A visual inspection of the site has been conducted and revealed four of the six fill pipes. Additional inspection will be performed to locate the other two USTs.

Sampling and analysis of contents of the USTs will be conducted as defined in the SAP included as Appendix A. As described in Section 3.1 of the SAP, a sample of the liquids will be collected from each UST and composited for analysis. Samples will be sent to an EPA-approved CLP laboratory to characterize the contents of the tanks sufficiently for shipping and disposal facility receipt. The most appropriate and cost-effective disposal option will be selected by WESTON based on review of analytical results.

Upon receipt of the results, the contents of the USTs will be transferred to an appropriate shipping tank which will be marked and labeled in accordance with state and federal regulations, and transported by a licensed hauler to an EPA-approved waste disposal facility. If results indicate a PCB concentration less than 50 ppm, fuel blending will be considered due to the lower disposal costs associated with this disposal method, to the extent that all other disposal facility requirements can be met. Incineration is the only approved disposal option per TSCA regulations for liquids containing a PCB concentration greater than 50 ppm.

Following characterization and removal of UST contents, a qualified subcontractor will be procured to remove the USTs, remove and dispose of any sludges, prepare and dispose of USTs, and perform required soil sampling. USTs will be closed and inspection/sampling will be performed in accordance with Bureau of Underground Storage Tank Regulations (BUSTR). If a release to the surrounding soil has occurred, excavation,

verification sampling, and disposal of affected soil will be performed until the cleanup criteria for the contaminant of concern is met. The AOC cleanup criterion for PCB in soil is 10 ppm.

2.2.2

Drums/Tanks

Several areas of labeled and unlabeled 55-gallon drums are located in and around the partially demolished Plant G structure. Volatile organic compounds, petroleum-based compounds, and PCBs are suspected to be present in these drums. Containers of unknown liquids will be handled and sampled as unknown chemical compounds in accordance with OSHA and EPA guidelines. If increased health risks are suspected, the HASP will be modified to incorporate the increased levels of protection necessary to safely characterize these materials. Samples will be sent to an EPA-approved laboratory to determine the contents of the containers.

Room G. Following debris relocation activities at the site in February 1997, visual inspection of the room within Plant G revealed the presence of approximately 50 drums; all appear to be labeled and are suspected of storing PCB-containing fluids. Using a personal level of protection recommended in the HASP (Appendix B), Room G will be entered to confirm the number of drums, check the condition of each drum, and record existing labeling information. Drum labeling and previous reports suggest that all drums in Room G contain transformer coolant. Assuming all substances are similar based on visual observation and information gathered by the use of field screening techniques, samples will be grouped together, composited, and handled as detailed in the SAP. One representative composite sample of all like drums located in Room G will be collected and submitted to a laboratory for RCRA characterization and PCB analyses.

Plant G. As many as 25 drums are located on the ground level of the structure, including two drums labeled "F02" and "F03", respectively. The remainder of the drums contain no labeling. Using a personal level of protection recommended in the HASP (Appendix B), the drums will be inspected to confirm the number of drums, check the condition of each drum, record any existing labeling information, acquire field screening information, and perform sampling as detailed in the SAP. The two drums labeled "F" waste will be sampled with a composite sample submitted to a laboratory for RCRA characterization and PCB analyses. The remainder of the drums will be sampled. Based on visual appearance of the material and information available from the use of field screening techniques, like drums will be grouped for composite RCRA characterization and PCB content sampling and analyses. Drums containing material not similar to that contained in other drums will be analyzed separately for RCRA characterization and PCB content.

AST. An aboveground storage tank labeled "caustic" material resides in a debris accumulation area southeast of the Plant G structure. Preliminary indications are that the tank contains only a few inches of rainwater that can be easily disposed of; however, contents will be confirmed and handled appropriately.

In all cases described above, drum labeling will be confirmed as appropriate or adjusted based on analytical results and will be labeled in accordance with state and federal regulations. Following receipt of sample results, WESTON will decide on appropriate disposal from the options available for each waste stream. A qualified subcontractor will be procured to remove the liquids and prepare and dispose of all drums in accordance with EPA-approved disposal regulations. Subcontractor selection will be based on OSHA HAZWOPER training and experience, possession of a valid EPA identification number for transportation of RCRA wastes, and cost for services.

A visual inspection of the surface where each of the drums were stored will be performed to determine if a release from the drums is evidenced. If a release to a concrete surface has occurred, absorbent material will be utilized to remove spilled liquids and dispose of in an appropriate manner. Soil samples will be collected in areas exhibiting staining and/or odor and submitted to a laboratory for RCRA characterization and PCB analyses. If contamination is found above applicable action levels, the contaminated material will be removed and the area will be resampled to confirm that the cleanup criteria have been met. The TSCA spill cleanup criterion for PCBs in soil is 10 ppm and for surfaces is 10ug/cm² per 40 CFR 761.125. Wipe sampling in accordance with TSCA protocols will be collected from cleaned surfaces to verify contamination above the cleanup criteria (10 ug/cm²) have been met.

2.2.3 *Transformers/Capacitors*

A previous report indicates that 11 of the 18 transformers documented as having been used at the site are reported to have contained coolant oils with levels of polychlorinated biphenyls (PCBs) exceeding 50 ppm. Many of these transformers were reported to have been drained and disposed of, or were staged at Plant G. Drums of used coolants that may contain PCBs are reported to be stored in Plant G. PCBs are also reported to exist in capacitors which were part of the electrical distribution system at the site. Approximately 50 capacitors are currently located in Room G and marked with PCB labels.

A thorough inspection of the transformers and capacitors will be conducted to identify potential PCB-containing materials by comparing labels to previous sample data. All transformers clearly identified with

labels indicating concentrations greater than 50 ppm PCB will be segregated for shipment and disposal. All transformers containing appropriate labels indicating PCB concentrations less than 50 ppm will be separated and disposed of appropriately. All other transformers at Plant G not appropriately labeled will be opened and coolants will be sampled as outlined in the SAP (Appendix A). A composite sample will be collected from the containers of spent coolant found in Plant G. Samples will be sent to an EPA-approved laboratory to determine the PCB content of the fluids.

Capacitor banks have been observed in the basement of the office building. Manufacturer information will be sought concerning the PCB content of these capacitor banks. If insufficient information is available to determine the PCB content, a sample of the coolant will be collected for PCB analysis.

Upon receipt and evaluation of the laboratory analytical results, the following disposal methods will be used for the coolant, transformers, and capacitors:

Spent Coolant

Fluids which have been determined to contain more than 50 ppm PCBs will be transported to an EPA-approved disposal facility for detoxification or incineration. Detoxification involves alkaline dechlorination of the liquid, followed by incineration of the resulting sludge coupled with fuels blending of the remaining oil.

Fluids which have been determined to contain less than 50 ppm PCBs will be recycled by fuels blending for energy recovery, or will be incinerated.

Transformers

Transformers which contain PCBs in concentrations less than 500 ppm will be appropriately drained and discarded as scrap.

Transformers which contain PCBs in concentrations greater than 500 ppm will be appropriately drained, rinsed, and disposed of at a chemical waste landfill, or will be incinerated.

For transformers that are empty upon inspection, labeling and information from previous reports will be used to determine what concentration of PCBs had been removed. If labeling does not provide sufficient documentation of former contents, the transformers will be considered PCB-contaminated electrical equipment.

Capacitors

All capacitors at the site will be assumed to contain PCBs in concentrations greater than or equal to 500 ppm and will be incinerated as per federal regulations (40 CFR 761.60 (b)(2)(iii)(A)).

In all cases, PCB wastes will be marked and labeled in accordance with state and federal regulations. The regulated materials will be transported by licensed haulers to EPA-approved waste disposal facilities.

A visual inspection of the surface where the PCB containing items were staged will be performed to determine if a release is evidenced. If a release to a concrete surface has occurred, absorbent material will be utilized to remove spilled liquids and will be disposed of in an appropriate manner. Soil samples will be collected in areas exhibiting staining, and will be submitted to a laboratory for RCRA and PCB analyses.

The AOC cleanup criterion for PCBs is 10 ppm and applies to surface and soil sampling. Areas exhibiting PCBs in excess of the cleanup criterion will be marked for cleanup through the OVAP.

2.2.4

Building Material

Asbestos containing materials (ACM) are reported to exist in the spray-applied fireproofing found in the office building, and in pipe insulation in the basement of the office building. Suspected ACM are also reported to exist in containers or bags located in a ground floor room in Plant G.

A thorough asbestos survey of the office building was conducted in February 1997 by WESTON to identify potential asbestos-containing building and construction materials. All containers and bags in Plant G will undergo a thorough evaluation to determine the potential presence of ACM.

If necessary, additional bulk samples of suspect ACM will be collected by an Ohio-certified Asbestos Hazard Evaluation Specialist. Sampling will be completed in accordance with US EPA asbestos inspection protocols as defined in the Sampling and Analysis Plan (Appendix A). Samples will be sent to a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited asbestos laboratory to confirm and define the asbestos content.

Upon receipt of the results, all confirmed ACM will be removed from the office building and/or Plant G by an Ohio-certified asbestos abatement contractor. The ACM will be containerized, and will be marked and

labeled in accordance with state and federal regulations. The ACM will be transported to an approved waste disposal facility.

During abatement operations, an independent Ohio-certified Asbestos Hazard Abatement Specialist will be contracted to provide oversight of the removal contractor. During the abatement operations, air monitoring will be conducted to determine potential worker and environmental exposure to asbestos fibers. Monitoring will include OSHA personnel monitoring, and high volume area sampling. Personnel monitoring will be conducted in accordance with OSHA regulations (29 CFR 1910.1001). High volume area monitors will also be placed in and around the work space, and will be located in such a manner to ensure that the effect of the removal can be evaluated for downwind locations.

Following the abatement activities, air samples will be taken within the former work area in order to evaluate the completeness of the abatement process. The results of the clearance testing will be evaluated to determine if the asbestos removal has been carried out to the satisfaction of the Hazard Abatement Specialist.

A post-removal visual inspection will be made to confirm completion of the task.

3

3.1

Monthly progress reports will be submitted to the US EPA's On-Scene Coordinator (OSC), beginning 30 calendar days following US EPA's approval of this Work Plan. Monthly reports will continue until consent order activities are complete. Information presented in the monthly reports will include:

- All developments noted during the preceding reporting period;
- Work performed and problems encountered;
- Analytical data received during the preceding reporting period;
- Developments anticipated during the next reporting period;
- Schedule of work to be performed during the next reporting period;
and
- Anticipated problems and planned resolutions of anticipated or previous problems.

3.2

A final report will be submitted to US EPA within 60 calendar days from the completion of all removal activities required under the AOC and will include the following:

- **Estimate of total costs incurred in complying with the AOC;**
- **Listing of quantity and types of materials removed from the site or handled onsite;**
- **Discussion of removal options considered;**
- **Listing of the ultimate destinations of materials removed from the site;**
- **Presentation of analytical results; and**
- **Relevant documentation, such as manifests, invoices, bills, contracts, and permits.**

The final report will include the required certification per the AOC by a person who supervised the preparation of the final report.

SCHEDULE

Figure 4 presents the proposed schedule for on-site sampling and removal actions.

Figure 4

Proposed Schedule for On-Site Sampling and Removal Actions

		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11
ACCESS CONTROL												
Fence Installation/Signs	Completed 3/14/97											
Move Debris from Fence Location	Completed 2/28/97											
Building Lockdown	Completed 2/28/97											
Site Security/Surveillance	Ongoing Since 2/24/97											
WORK PLAN PREPARATION												
Work Plan	Completed 4/22/97											
Sampling & Analysis Plan	Completed 4/22/97											
Health & Safety Plan	Completed 4/22/97											
EPA Approval												
REMOVAL ACTIONS												
Site Inventory	Completed 3/20/97											
Contractor Selection												
RCRA/TSCA Liquids												
ACM Abatement & Oversight												
Debris Removal												
Laboratory												
Implementation of Sampling Program												
Asbestos Survey & Sampling	Completed 3/17/97											
USTs Location & Sampling												
Transformer/Capacitor Sampling												
Drum Sampling												
Removal and Disposal												
Asbestos Abatement												
RCRA/TSCA Liquids												
UST Liquids												
Debris												
Drum, Battery, Cylinder												
REPORTS AND NOTIFICATIONS												
EPA OSC Notification of Activity												
Asbestos Abatement Notification												
Monthly OSC Reports												
FINAL REPORT SUBMITTAL												

5

STAFFING

The WESTON project team for the scope of work described in this Work Plan includes the Project Director, Project Manager, Field Team Leader, Health and Safety Officer, Chemistry Team Leader, field team members, and associated support personnel.

An organization chart showing the relationships among these positions and a description of the level of responsibility for each position are included in Section 2 of the SAP (Attachment A).

APPENDIX A

Sampling and Analysis Plan

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Brad white

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Paul Steadman

312 353.4775

U.S. EPA, Region 5

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GH&R FOUNDRY SITE

SAMPLING AND ANALYSIS PLAN

24 April 1997

Prepared for:

Foundry Sales & Supply, Inc.

Prepared by:

**Roy F. Weston, Inc.
Cincinnati, Ohio**

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1. INTRODUCTION

1.1. Purpose and Objective

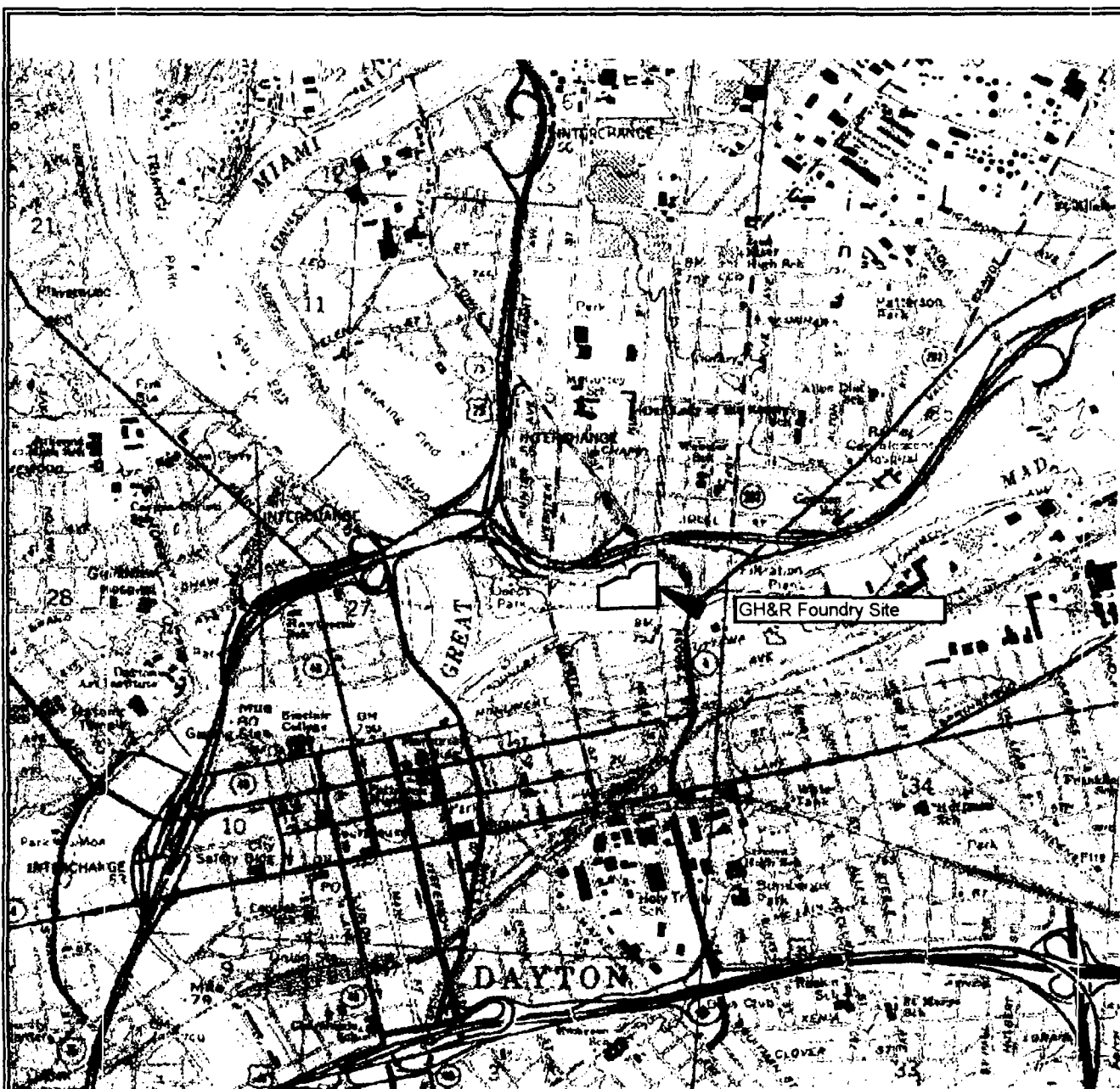
This Sampling and Analysis Plan (SAP) has been generated in order to define the approach and methods to be used to determine the nature and volume of waste which will be disposed of from the GH&R Foundry site in Dayton, Ohio. The cleanup of the foundry is the subject of a Consent Order between U.S. EPA and Foundry Sales and Supply, Inc. This SAP supports the Work Plan which has been prepared in response to that Consent Order.

1.2. Site Description

The GH&R Foundry operated at the site for over 35 years, producing grey iron castings until operations ceased on 1983. The plant contained a 190,000 square foot (ft²) main building (Plant H), a 86,000 ft² core manufacturing building (Plant G), and a 5,700 ft² office building. In 1988, the site was purchased by Ohio Industrial Trading Company in a joint venture between Foundry Sales and Supply, Inc. and John Paul Enterprises. The foundry equipment was removed, and the buildings partially razed. Active salvage and cleanup activities ceased in 1995, leaving the site with partially demolished buildings and partially segregated demolition debris.

1.2.1. Location and Facility Layout

The GH&R Foundry property is an 11.8 acre site located at 400 Detrick Street in Montgomery County, Dayton, Ohio (see Figure 1-1). The site is bordered on the south by the Mad River, and to the east by the B&O railway. Immediately west of the property is a building owned by the Digitron Corporation. The site is bordered to the north by Route 4. A site plan is shown on Figure 1-2.



**GH&R Foundry
Dayton, Ohio**

Site Location

Figure 1-1



Scale:
Not to Scale

WESTON

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1614763

00011/00050

4-25-97

1293-4680-9

Brad White

513 925-3440

ROY F WESTON INC

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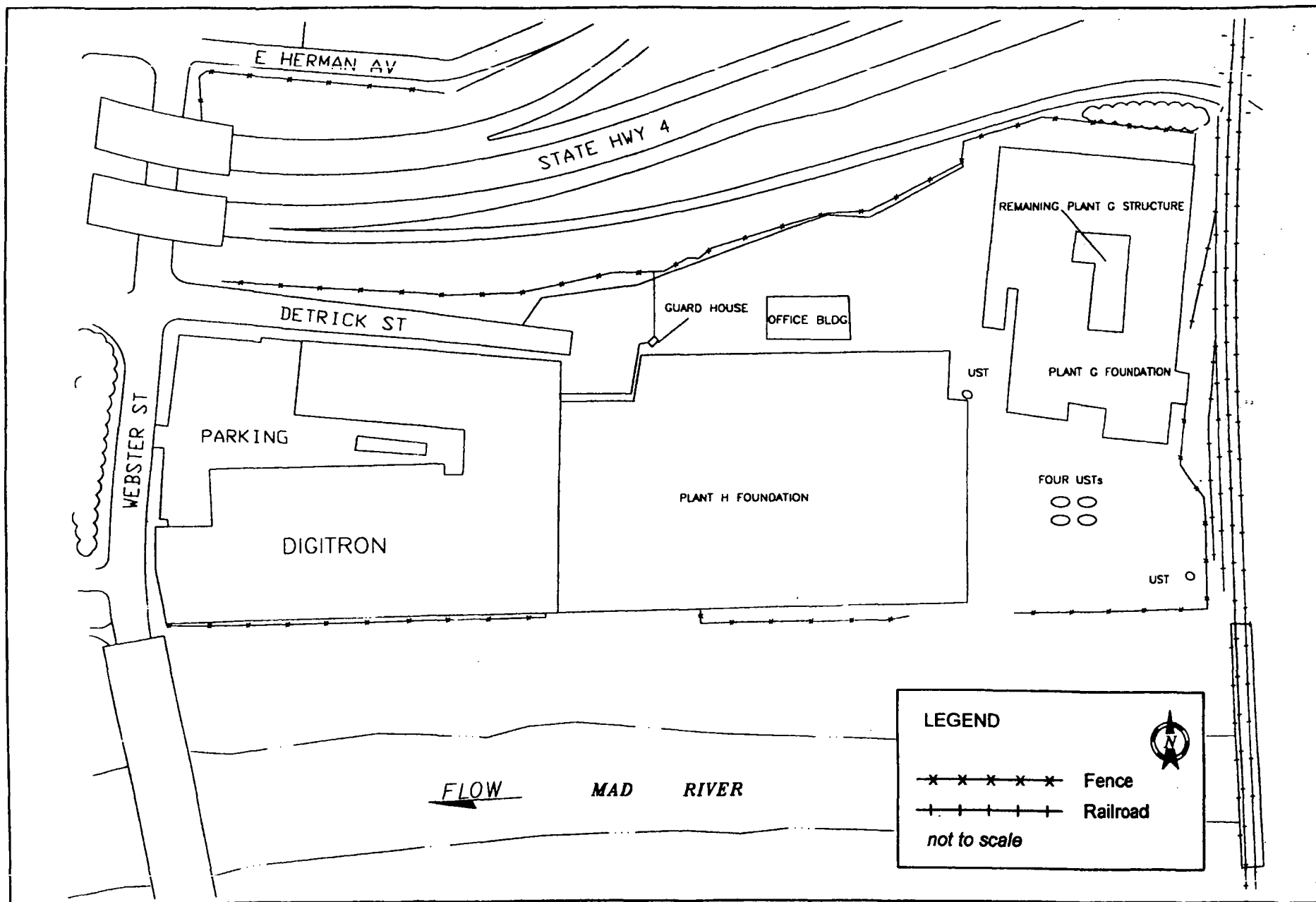


Figure 1-2 - Site Plan

2. PROJECT ORGANIZATION AND RESPONSIBILITY

Roy. F. Weston, Inc. (WESTON®) has been contracted to perform the sampling, analysis, and removal efforts at the Foundry Sales site in Dayton, Ohio. The WESTON project team organizational structure for this removal effort is depicted in Figure 2-1.

2.1. Project Organization

The Project Manager is responsible for assuring compliance with, and implementing the requirements of the Consent Order, and is responsible to the EPA On-Scene Coordinator (OSC).

The team leader and staff assigned to this project report to the Project Manager, and have sufficient authority to:

- Initiate action to prevent the occurrence of any nonconformity related to product, process and quality system;
- Identify and record any problems affecting the product, process and quality system; and
- Assure that further work is stopped or controlled until proper resolution of a non-conformance, deficiency, or unsatisfactory condition has occurred and the deficiency or unsatisfactory condition has been corrected.

2.2. Description of Personnel Responsibilities

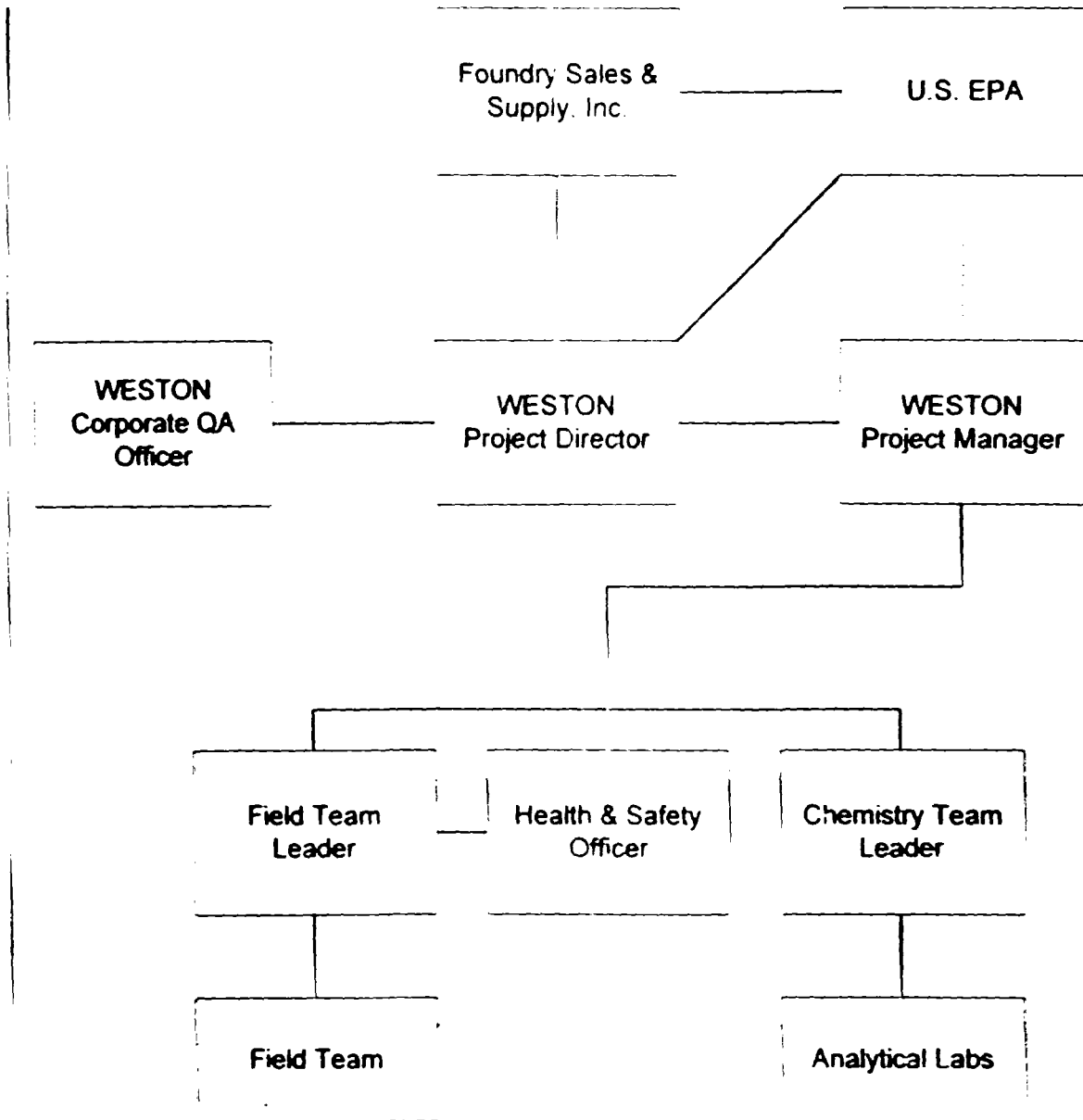
2.2.1. *WESTON Project Director*

The WESTON Project Director is the Senior WESTON representative on the project team who is involved with day-to-day project activities. The Project Director is responsible for project-level quality assurance and maintains the primary WESTON relationship with Foundry Sales & Supply, Inc., the consent order respondent. The WESTON Project Manager reports to the WESTON Project Director regarding WESTON's involvement in this Scope of Work.

2.2.2. *WESTON Project Manager*

The WESTON Project Manager is responsible for implementing the contracted services, managing the project staff, complying with performance schedules, implementing the sampling and analysis plan, and taking corrective measures for planned, observed, or reported deficiencies from the SAP.

Figure 2-1
Project Team Organization



2.2.3. *WESTON Field Team Leader*

The WESTON field team leader is responsible for coordinating on-site work, complying to the specifications in the SAP, and reporting planned and observed deviations from the SAP specifications to the Project Manager.

2.2.4. *WESTON Chemistry Task Leader*

The chemistry task leader is responsible for identifying laboratories to perform the analyses, resolving technical analysis problems experienced by the laboratories, and reporting to the Project Manager deviations from the quality assurance specifications of the SAP.

2.2.5. *WESTON Health and Safety Officer*

The Health and Safety Officer (HSO) is responsible for verifying the work plan and the health and safety plans provide for the protection of the field sample team. The HSO is also responsible for verifying by at least one on-site visit that the work is being performed in accordance with the Health and Safety Plan and that no new conditions are present which require the revision of the plan.

2.2.6. *Field Team Members*

The field team members are responsible for complying to the work plan which includes this SAP. If a field team member determines that work is not compliant to the work plan, then the field team member is responsible for notifying the Project Manager or Field Team Leader and initiating a corrective action report (CAR) per Section 13.

2.2.7. *Quality Assurance Officer*

The chief Corporate Quality Assurance (QA) Officer is the Executive Vice President, Quality Assurance/Finance. Corporate QA managerial and implementation responsibilities and authorities are held by the Corporate Quality Assurance Director. The position has the authority to organize, initiate, and monitor quality assurance programs. The Corporate QA Director can review and approve/disapprove all Division Quality Assurance Plans; can initiate, man (i.e., teams and committees), and allocate costs of the audit process for the purpose of identifying problems and determining compliance with Corporate policies and practices; and is obligated to recommend corrective action depending upon the situation.

2.2.8. *Laboratory Manager*

The Laboratory Manager has the authority to effect those policies and procedures to ensure that only data of the highest attainable quality is produced. The Laboratory Manager supports a QA Section which is not subordinate to or in charge of any person having direct responsibility for sampling and analysis.

2.2.9. *Laboratory Project Manager*

The laboratory project manager is responsible for maintaining the laboratory schedule, ensuring that technical requirements are understood by the laboratory, summarizing QA QC requirements for the project, and advising the WESTON Project Manager of all variances.

2.2.10. *Laboratory Quality Assurance Manager*

The QA Manager has the full-time responsibility to evaluate the adherence to policies and to assure that systems are in place to produce the level of quality defined in this Sampling and Analysis Plan (SAP). The QA Manager reviews program plans for consistency with organizational and contractual requirements and will advise appropriate personnel of deficiencies. The QA Manager maintains a sufficient staff to initiate and oversee audits and corrective action procedures, performs data review, and maintains documentation of training. The QA Manager has the authority to stop work on projects if QC problems arise which affect the quality of the data produced.

3. SAMPLING PLAN

Potentially hazardous materials have been identified or are suspected to exist at the GH&R Foundry site in USTs, drums and other above ground storage tanks, transformers and capacitors, and building materials. Wastes associated with each of these containment units will be sampled for identification and proper disposal. Additional sampling may be performed for surfaces, soil, and sludges, if required. Proper and legal shipping of a waste for disposal first requires identification of its RCRA Hazardous Waste Code per 40 CFR 261. Sampling and analysis will be performed to sufficiently characterize each waste stream prior to offsite shipment and disposal.

3.1. USTs

Previous reports and site drawings indicate that there are a total of six USTs currently located on the GH&R Foundry property. According to facility drawings, four USTs, each with a capacity of 20,000 gallons, contained #2 fuel oil while the foundry was in operation. According to a 1986 State Fire Marshal UST Notification form, a 1,000-gallon kerosene and 1,500-gallon core oil UST are also located on the property. Recent visual inspection of the property revealed that neither the kerosene nor the core oil UST possessed fill pipe caps, exposing both to accumulation of precipitation. Quantities of remaining contents are unknown. It is suspected that salvaging operations may have resulted in draining of PCB-containing transformer fluids into one or more of the USTs.

Following positive location of all USTs, the quantity of liquid remaining in the tank will be estimated by "sticking" the tank and calculating volume based on tank geometry and liquid level. One sample will be collected from each UST using dedicated tank samplers (disposable Teflon bailers).

Field screening of the samples will allow quick confirmation of compatibility of the sample contents. Field screening techniques will include an initial scan with a PID or FID, followed by a specific gravity check. The fuel oil, kerosene, and core oil remaining in the USTs are expected to yield similar field screening results. Any deviation in the results of the field screen will result in segregation of unlike materials, and separate grab samples for analytical tests.

Based on volume estimates calculated for each tank, a representative composite sample of all similar UST contents will be prepared and shipped to a laboratory for RCRA characterization analyses.

Justification for preparing a composite sample rather than submitting individual samples for analyses is based on the following:

- Fuel oil, kerosene, and core oil are all petroleum hydrocarbons which will be disposed of in the same manner (fuel blending or incineration);
- All USTs have the potential to contain PCBs; and
- Existing information supports the expectation that no other contaminants were introduced.

As specifically described in the Work Plan, field screening and analytical sample results will be used to determine the most suitable disposal option.

3.2. Drums/Tanks

Several areas of labeled and unlabelled 55-gallon drums are located in and around the partially demolished Plant G structure. Volatile organic compounds, petroleum-based compounds, and PCBs may be present at the site in these drums. Drums labeled as PCB-containing materials will be sampled and shipped for disposal. Labeled drums of compatible products will be bulk sampled and shipped for disposal. Containers of unknown liquids will be handled and sampled as unknown chemical compounds in accordance with OSHA guidelines.

Field screening techniques will be used to segregate the contents of the unlabeled drums/tanks. Screening techniques will include an initial scan with a PID or FID followed by a specific gravity check. Observations made during the specific gravity check will allow segregation of organic and aqueous compounds. Aqueous liquids will be further segregated into acids and bases as a result of field pH tests.

The HASP will describe the personal protective equipment necessary to safely characterize these materials. Samples will be sent to a CLP laboratory in order to define disposal characteristics of the non-asbestos wastes. In order to fulfill the long-term cleanup goals of the site, the selected lab should also be certified through the OVAP.

Room G. Following debris relocation activities at the site in February 1997, visual inspection of the room within Plant G revealed the presence of approximately 50 drums, all appear to be labeled and are likely to store PCB-containing fluids. Using a personal level of protection recommended in the HASP (Work Plan, Appendix B), Room G will be entered to confirm the number of drums, check the condition of each drum, and record existing labeling information. Drums that appear intact, not bulging, and exhibit no other visible characteristic that may be deemed as potentially harmful to site workers will be opened by hand. Drums with the appearance of integrity problems or bulging, or exhibiting other

potentially harmful characteristics will be opened remotely. One sample will be collected from each drum using a dedicated drum thief and transferred to a sample bottle. A composite sample of all substances that exhibit similar field screening results will be prepared and submitted to a laboratory for RCRA characterization analyses and PCB content analyses. Unlike substances will be handled separately and analyzed individually. The Field Team Leader will determine, during sampling activities, if substances are to be handled individually or composited.

Plant G. As many as 25 drums are located on the ground level of this structure, including two drums labeled "F02" and "F03." Many of the drums are unlabeled. Using a personal level of protection recommended in the HASP (Work Plan, Appendix B), the drums will be inspected to confirm the number of drums, check the condition of each drum, and record any existing labeling information. Drums that appear intact and not bulging, and exhibit no other visible characteristic that may be deemed as potentially harmful to site workers will be opened by hand. Drums with the appearance of integrity problems, bulging, or exhibiting other potentially harmful characteristics will be opened remotely. One sample will be collected from each drum using a dedicated drum thief or COLIWASA and transferred to a sample bottle. A composite sample of all substances that exhibit similar field screening results will be prepared and submitted to a laboratory for RCRA characterization analyses and PCB content analyses. Unlike substances will be handled separately and analyzed individually. The Field Team Leader will determine, during sampling activities, if substances are to be handled individually or composited.

The two drums labeled "F" waste are assumed to be similar and will be sampled with a composite sample submitted to a laboratory for RCRA characterization and PCB analyses.

AST. An aboveground storage tank labeled "caustic" material resides in a debris accumulation area southeast of the Plant G structure. Indications are that the tank contains only a few inches of rainwater that can be easily disposed of; however, contents will be confirmed and handled appropriately.

In all cases described above, drum labeling will be confirmed as appropriate or adjusted based on analytical results and will be labeled in accordance with state and federal regulations. The collected samples will be transferred to bottles and submitted for RCRA characterization and PCB analysis. The results will be used to complete the shipping manifest and address the requirements of the treatment facility.

Justification for preparing a composite sample rather than submitting individual samples for analyses is based on the following:

- With the exception of the "F" drums, all drums are unlabelled and may contain unknown materials; and
- All drums have the potential to contain PCBs.

As specifically described in the Work Plan, sample results will be used to determine the most suitable disposal option.

3.3. Transformers/Capacitors

Transformers are located in and around Plant G. During a previous site investigation, some of the transformers were found to contain PCBs. Transformers will be shipped offsite for sampling and disposal. Oil inside the transformers will be sampled in accordance with ASTM D923-91 to determine disposal action. The samples will be submitted to a CLP laboratory for PCB analysis. The results will be used to select appropriate disposal options, and to meet any TSD requirements. Capacitors will be banded onto skids and transported to a TSCA approved incinerator for destruction.

3.4. Building Materials

Previous reports indicate that the office building contains construction materials that are ACM. In February 1997, WESTON collected samples of materials suspected to contain asbestos. Based on the laboratory analysis of the building materials from WESTON's survey, containment areas will be established and the asbestos will be removed for disposal.

An Ohio-certified Asbestos Hazard Abatement Specialist will oversee the activities of the abatement contractor and monitor possible breaches of asbestos containment.

During the removal of the asbestos containing building materials, the air outside the containment area will be sampled to determine whether asbestos fibers are escaping from the containment area into the surrounding area. The samples will be collected using a minimum of 3 high volume air sampling pumps and cassette filters. The air samples will be submitted to the laboratory for analysis. Results will be provided on a 24-hour turnaround, and will be promptly reviewed in order to evaluate containment efficiency.

If air samples reveal that a breach of containment has occurred, the Hazard Abatement Specialist will have the authority to implement corrective actions with the abatement contract to prevent reoccurrence. All activities of the abatement contractor and Hazard Abatement Specialist will be

conducted in accordance with National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations, USEPA guidelines, and standard industrial practices for asbestos abatement.

In addition, air samples will be taken within the former work area in order to evaluate the completeness of the abatement process. The results of the clearance testing will be evaluated to determine if the asbestos removal has been carried out to the satisfaction of the Hazard Abatement Specialist.

4. ANALYTICAL PROGRAM

The screening and analytical laboratory methods used in this investigation are designed to provide data of sufficient quality to support decisions regarding the extent of remedial measures to be instituted at the site. The application of field screening technologies will provide a large quantity of semi-quantitative data from the potential wastestreams quickly and at relatively low cost. Field screening tools will be used in conjunction with analytical methods to direct removal actions and ensure the safety of site workers.

4.1. Field Screening Technology

4.1.1. *PID*

A photoionizing detector (PID) will be used as a screening tool to provide a semi-quantitative measure of organic compounds in the workers' breathing zone, and in the headspace of confined soil or liquid samples. The equipment draws a sample of vapor through a beam of ultraviolet light. Organic constituents within the vapor are ionized. The ions are then collected at an electrode and enables current to then be generated. The instrument is factory calibrated to benzene, and is field calibrated against an isobutylene standard.

4.1.2. *Test Kits*

PCB specific test kits may be used as a screening tool to provide a semi-quantitative measure of PCBs in soil or liquid samples collected at the site. The test kits use reactions to colorometrically indicate the presence of PCBs in the soil (or oil) at concentrations above 50 ppm.

4.1.3. *MiniRam*

A MiniRam will be used to provide a semi-quantitative measure of the amount of particulate released to the air during asbestos and debris removal operations. Action levels for the MiniRam will be established in the HASP to ensure the safety of the workers and surrounding community during the removal operation. Prior to using the MiniRam, the instrument will be inspected for obvious damage. After completing the visual inspection, the zero setting on the MiniRam will be set following the manufacturer's instruction. The instrument will provide data with a precision of plus or minus 0.02 mg/m³. If the instrument can not be calibrated to zero, then the instrument will be identified as non-conforming and will not be used.

4.1.4. pH Test Strips

Test strips will be used as a field screening tool measure the pH of liquid samples collected at the site. The test strips provide a colorimetric indication of pH in aqueous solutions. Precision of the test is reported by the manufacturer to be plus or minus 0.5 pH units.

4.2. Laboratory Analyses

Non-asbestos containing solids, liquids, soils and QC samples will be analyzed for the parameters shown in Table 4-1. Included in the table are analysis methods and laboratory reporting limits for the analytes. The analyte list includes all compounds necessary to characterize the waste in accordance with RCRA and TSCA regulations. These compounds are found in the RCRA TCLP list of 40CFR261, with additional organic compounds found in the RCRA F list and in TSCAs list of regulated PCBs. The reporting limits were selected based on the regulatory action limits found in 40CFR261, 40CFR268, and 40CFR761 for these compounds. Reporting limits for both liquids and soils/solids have been presented in the table. The soil/solid limits assume that solid waste and soil like materials will be reported on a dry weight basis. It is acceptable for the laboratory to use lower reporting limits than those specified in Table 4-1.

In the event the laboratory's reporting limit exceeds the limit specified in Table 4-1 due to sample interference, dilutions, etc., then a laboratory representative must notify the WESTON Project Manager. The WESTON project manager will evaluate the impact of the exceeded detection limits on the data usability.

Table 4-1 - Laboratory Analyses and Reporting Limits

Analyte	Analysis Method	Liquid (mg/L)	Soil/Solid (mg/kg)
Volatile Organic TCLP Target Analytes			
Vinyl Chloride	SW1311/SW8240	0.2	N/A
1,1-dichloroethene	SW1311/SW8240	0.7	N/A
Chloroform	SW1311/SW8240	6.0	N/A
1,2-dichloroethane	SW1311/SW8240	0.5	N/A
2-butanone	SW1311/SW8240	200.0	N/A
Carbon Tetrachloride	SW1311/SW8240	0.057	N/A
Trichloroethene	SW1311/SW8240	0.7	N/A
Benzene	SW1311/SW8240	0.54	N/A
Tetrachloroethene	SW1311/SW8240	0.56	N/A
Chlorobenzene	SW1311/SW8240	100	N/A
Volatile Organics - Target Analytes			
Methylene Chloride	SW8240	0.089	30
Acetone	SW8240	0.28	160
Carbon Disulfide	SW8240	3.8	4.8
1,1,1-Trichloroethane	SW8240	0.054	6.0

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Analyte	Analysis Method	Liquid (mg/L)	Soil/Solid (mg/kg)
Physical Characteristic Target Analytes			
Ignitability	SW1010	<140°F	NA
Corrosivity	SW1011	≤2 or ≥12.5	NA
pH	SW9040	NA	NA
Asbestos Analyses			
Asbestos Bulk	EPA600/R-93-116	N/A	N/A
Asbestos Fibers	NIOSH 7400	N/A	N/A

* Indicates that results are in mg/L from TCLP extract.

4.2.1. *RCRA/TSCA Analyses*

Non-asbestos wastes which are destined for disposal will be subjected to a minimum battery of chemical tests designed to evaluate the applicability of RCRA and TSCA classification codes to the waste constituents. A representative sample of each waste will be sent to an EPA-approved laboratory and will be analyzed for volatile and semi-volatile organic constituents, inorganic elements, and physical characteristics as shown in Table 4-1. Results of the analyses will be used to determine the applicable RCRA D and F waste codes, and the level of PCB content in the waste. Based on knowledge of the site, pesticides or herbicides will be omitted from analyses. Each of the methods which will be used are described in the following subsections.

4.2.1.1. TCLP Analyses

In this analysis, based on the solids content in a sample, a sample is either directly filtered or leached with an acetic acid solution. The leachate is then filtered and analyzed by methods specific for each sample matrix volatiles (8240), semi-volatiles (8270), metals (6010), and mercury (7470). The field team will specify a matrix spike for each sample matrix submitted.

4.2.1.2. Ignitability

To determine ignitability of liquid samples, the sample is placed in a closed cup and its temperature is increased incrementally until the liquid ignites or its temperature exceeds 160°C. The temperature at which the liquid ignites is recorded as the flash point. Solid samples are exposed to an open flame. If the material ignites, it is presumed to be flammable.

4.2.1.3. Corrosivity

To determine sample corrosivity, the sample's pH is measured with a pH electrode. If the pH is less than or equal to 2 or greater than or equal to 12, then the material is corrosive.

4.2.1.4. Reactivity

Tests are performed to characterize reactivity for two analytes, cyanide and sulfide. To determine cyanide reactivity, a sample is acidified to a pH less than or equal to 2. If hydrogen cyanide (cyanide gas) is generated, the gas is collected in an alkaline scrubber. The collected cyanide is then reacted with chelating agents and measured by colorimetry following SW846 Method 9010.

Sulfide reactivity is determined by acidifying a sample to a pH less than or equal to 2. If hydrogen sulfide is generated, the gas is collected in an alkaline scrubber solution. The alkaline scrubber solution is reacted with methylene blue and its sulfide content is determined by colorimetry following SW846 Method 9010.

4.2.1.5. Volatiles Analyses

Samples will be analyzed for VOCs by the EPA SW8240 using gas chromatography and mass spectrometry as a means for compound identification. Capillary columns as specified in the method will be employed.

4.2.1.6. Semi-volatile Analyses

Samples will be analyzed for SVOCs by the EPA SW8270 using gas chromatography and mass spectrometry as a means for compound identification.

4.2.1.7. Alcohol Analyses

Samples will be analyzed for alcohols (methanol and 2-ethoxyethanol) by direct injection on a gas chromatograph following EPA SW8015 with modifications.

4.2.1.8. PCB Analyses

The EPA SW8080 will be used to analyze samples for PCBs. This method uses gas chromatography for separating and identifying TCL PCB compounds. The capillary columns specified in the method will be used.

4.2.2. Asbestos Analyses

4.2.2.1. Asbestos Identification

Suspect asbestos containing materials which have been identified in initial surveys by a Certified Asbestos Hazard Evaluation Specialist, will be sampled in accordance with AHERA sampling guidelines, and will be analyzed for asbestos constituents via polarized light microscopy (PLM).

All analyses will be performed in accordance with U.S. EPA 600/R-93-116. Asbestos content will be determined by visual estimation methods and reported as a volume percentage. Sample results be reported for:

- Friability
- Chrysotile
- Amosite
- Crocidolite
- Total Asbestos

4.2.2.2. Asbestos Fiber Counting

Air samples will be taken during asbestos removal operations as per OSHA guidelines, and will be analyzed by Phase Contrast Microscopy (PCM) for total fiber count per NIOSH method 7400. Results will be reported in fibers per cubic centimeter of air. All laboratories will be accredited through EPA's National Laboratory Accreditation Program or the NIOSH sponsored PAT program.

4.2.3. *Disposal Facility Analyses*

Individual disposal facilities will have unique requirements for additional sampling based on the specific disposal requirements and needs. These analyses will be performed on representative samples supplied by the field team. The disposal facility will be responsible for adherence to their own protocol and analytical procedures for these non-regulated analyses, and will be responsible for QA/QC appropriate to their internal standards and programs.

Analytical costs will be minimized by use of the contracted disposal facility laboratory if possible. This will allow analytics for disposal and regulatory profiles to be prepared from simultaneous chemical extractions, surrogates, calibration checks, etc.

5. DATA REDUCTION, REPORTING, AND VALIDATION

5.1. Data Reduction

5.1.1. *Field Data Reduction*

All equations used in the field to calculate final concentrations and volumes of wastes will be recorded in appropriate field logs. Calculations will be checked by the field team member performing the measurement prior to a secondary review of the data. Subjective data including descriptions and observations will also be recorded in the field logs.

5.1.2. *Laboratory Data Reduction*

Data reduction is performed by the analyst and consists of calculating concentrations in samples from the raw data. The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values. Copies of all raw data and the calculations used to generate the final results, such as bound laboratory notebooks, strip-charts, chromatograms, LOTUS spreadsheets and LIMS record files, are retained on file for a minimum of 6 years, and shall be available for EPA inspection upon request.

Calculations and data reduction steps for various methods are summarized in the respective laboratory SOPs or program requirements.

5.2. Data Review

5.2.1. *Field Data Review*

The field team members review the completeness of their data records continually. When a field team member has completed making entries for the week, a secondary review will be performed by a peer or supervisor. The secondary reviewer will verify the data records are complete, and will check for inconsistencies or anomalies. Any discrepancies will be immediately resolved after seeking clarification from the field personnel as necessary. Subjective data will be reviewed for reasonableness and completeness by a peer or supervisor. Corrective action will be taken as necessary to correct any deficiency, and a corrective action report will be filed as described in Section 6.6.

5.2.2. *Laboratory Data Review*

At the laboratory, the individual analyst continually reviews the quality of data through calibration checks, quality control sample results, and performance evaluation samples. Data review is initiated by the analyst during, immediately following, and after the completed analysis. A secondary review of the data is performed by the supervisor, analyst or data specialist. The peer reviewer is trained by the QA Section, Section Manager or Unit Leader to perform the data review.

Unusual or unexpected results will be reviewed and a resolution of the problem will be documented in a sample discrepancy report (SDR) or corrective action report (CAR). If suspect data is reported, the out-of-control events will be addressed in a case narrative. Copies of the SDRs and/or CARs may be included in a data package as needed.

5.3. **Data Reporting**

Field data and calculations will be recorded in bound field logbooks. Copies of filed logbooks will be made weekly, and will be stored at an offsite location. Field data will be recorded in a manner as complete as possible, and will be legible and complete enough to permit logical reconstruction of events by a qualified individual. At the completion of the field program, field logbooks will be returned to the project files.

Analytical reports will be comprised of final results (uncorrected for blanks and recoveries unless specified), methods of analysis, levels of reporting, surrogate recovery data, and method blank data. In addition, special analytical problems will be noted in the case narratives. The number of significant figures reported are consistent with the limits of uncertainty inherent in the analytical method. Consequently, most analytical results will be reported to no more than two (2) or three (3) significant figures. Data are normally reported in units commonly used for the analyses performed.

Concentrations in liquids are expressed in terms of weight per unit volume (e.g., milligrams per liter, mg/L). Concentrations in solid or semi-solid matrices are expressed in terms of weight per unit weight of sample (e.g., micrograms per gram, µg/g). Solid and semi-solid matrices will also be reported on a dry weight basis. Reporting limits take into account all appropriate concentration, dilution, and/or extraction factors.

If any analytical anomalies were encountered during the analyses, e.g., an out-of-control matrix duplicate, it will be documented in a case narrative.

5.3.1. *Hardcopy Data Report Contents*

The laboratory will provide a case narrative, a copy of the field chain-of-custody, the sample results in a neat tabular format, and a summary of associated quality control check results. The case narrative will include the following minimum information:

- The date the report was issued;
- A cross index of field sample identifications to laboratory sample identifications;
- A summary of the analyses performed for each field sample;
- The laboratory batch number;
- A discussion of anomalies, quality control checks which failed criteria, missed holding times, etc.;
- The project name and reference number (work order);
- The condition of the samples at receipt by the laboratory; and
- The laboratory manager's or laboratory project manager's signature.

The quality control results associated with the samples includes:

- A tabular listing of surrogate recoveries;
- A tabular listing of any associated laboratory control sample recoveries;
- A tabular listing of laboratory duplicates which may have been performed;
- A tabular listing of laboratory matrix spike recoveries; and
- A tabular listing of the laboratory blanks which were used with the samples.

The report must include adequate information in either the tables of results or in the case narrative to associate a sample result with the reported quality control data.

5.3.2. *Electronic Data Deliverables*

The laboratory is required to provide an electronic data deliverable. The electronic deliverable will be formatted as either a spreadsheet or fixed length data file. If a spreadsheet is used, the format must be compatible with Microsoft® Excel version 8 or earlier. The electronic deliverable will include the following information:

- Laboratory Sample id;
- Field Sample id;
- Analysis;
- Parameter (analyte, including surrogates);
- Result;
- Unit (ug/kg, ug/L, mg/kg, mg/L, %);
- Data Qualifier (Standard CLP qualifiers);
- Date Received;
- Date Extracted/Prepared; and
- Date Analyzed.

The information above will constitute one record (row) in the data file.

5.4. Data Quality Assessment

This project has been defined as Quality Assurance Level 2 (QA2) by the USEPA in accordance with the Removal Program Representative Sampling Guidance, Volume 1, Publication 9360.4-10, November 1991. Under this quality assurance level, the laboratory data are collected as confirmation of field screening results and no data validation is required. However, in comments on the draft copy of this plan by the USEPA, the USEPA requested that data validation be performed on the data. Ten percent of the data collected for chemical analysis will be subjected to data validation as described in Section 5.4.1 of the plan. All of the data will be subjected to data verification as specified in Section 5.4.2.

5.4.1. Data Validation

Samples will be submitted for GC/MS volatile analysis, GC volatile analysis, GC/MS semi-volatile analysis, PCB GC analysis, inorganic (metals) analysis, and general chemistry (cyanide and sulfide). The other analyses are characteristic testing and not subject to data validation.

5.4.1.1. Calibration

The validator will assess whether the laboratory adhered to the calibration criteria specified in this plan and in the referenced methods. If the validator determines the laboratory failed to adhere to a required criteria (RSD, %D, RF, etc.), the affected data will be qualified estimated (J). If the validator assesses that the data may have been severely biased and are unusable, the affected data will be qualified rejected (R).

5.4.1.2. Spectral and Chromatographic Interpretation

The validator will review the spectra and chromatograms to verify that the laboratory analyst properly evaluated the data. If the validator determines there is an interpretation error, then the validator will indicate the proper interpretation on the results summary sheet for the affected sample. The incorrect entry will be lined out with a single line, dated and initialed by the validator. If the validator believes that the problem may be systematic and has the potential to impact the usability of the data, the validator will recommend additional validation of the other samples to the WESTON project manager and the WESTON project manager will decide how much more data should be validated.

5.4.1.3. Calculations

The data validator will verify at least one set of calibration data for one analyte. If a calculation error is found in the calibration data and the analysis involved multiple analytes, then the validator will determine whether other analytes were affected and correct affected sample results as appropriate.

The data validator will also verify at least one sample results calculation for at least one analyte for each sample validated. If an error is found in the calculation and the analysis involved multiple analytes, then the validator will determine whether other analytes were affected and correct the affected sample results.

Systematic calculations errors will be reported by the validator to the WESTON project manager. The WESTON project manager will assess whether to perform additional validation.

5.4.1.4. Blanks

The validator will review blank data associated with the sample submitted for data validation. If a target analyte was detected in a blank or more than one blank, then the validator will select the largest blank result for each detected analyte. If an associated sample result is less than five times the blank concentration, then the results will be qualified non-detect (U).

Note: For common laboratory contaminants, as defined in the USEPA CLP Functional Guidelines, a factor of 10 will be used instead of 5 as specified above.

5.4.1.5. Surrogate Recoveries

Positive and non-detect sample results associated with surrogate recoveries below criteria will be qualified estimated (J,UJ). Positive sample results

associated with surrogate recoveries above criteria will be qualified estimated (J).

5.4.1.6. Duplicates

Duplicate results outside the acceptance criteria specified in this plan will be qualified estimated (J,UJ).

5.4.2. Data Verification

Data verification is performed to evaluate whether the quality control requirements for field duplicates, field blanks, trip blanks, surrogates, matrix spikes, laboratory blanks, and laboratory control samples were met.

If quality control outliers are observed in the verified data, the qualifications described in Table 5-1 may be applied to the data.

Table 5-1 - Data Verification Qualifiers

Qualifier	Application
U	Sample results which are less than 5x times the blank contaminant level will be qualified non-detect (U). If the affected analyte is a common laboratory contaminant, as defined in the USEPA Functional Guidelines, then 10x will be used instead of 5x.
J	Positive sample results associated with quality control recoveries outside acceptance limits will be qualified estimated (J).
UJ	Non-detect sample results associated with quality control recoveries below acceptance limits will be qualified estimated (UJ).
R	Sample results associated with extremely poor quality control recoveries or which are suspected of being extremely biased, as determined by the person performing the verification, will be rejected (R).

6. QUALITY ASSURANCE/QUALITY CONTROL

6.1. Equipment Calibration

6.1.1. *Field Instrument Calibration*

6.1.1.1. MiniRam

A MiniRam is used to measure the amount of particulate in air. Prior to using the MiniRam, the instrument will be inspected for obvious damage. After completing the visual inspection, the zero setting on the MiniRam will be set following the manufacturer's instruction. If the instrument can not be calibrated to zero, then the instrument will be identified as non-conforming and will be replaced with a functional instrument.

6.1.1.2. PID

A Photoionization Detector (PID) will be used in the field to measure organic vapor. Prior to using the PID, the instrument will be inspected for obvious damage. After completing the inspection, the instrument's response will be set using a isobutylene calibration check standard per the manufacturer's recommended directions. If the instrument can not be calibrated to zero, then the instrument will be identified as non-conforming and will be replaced with a functional instrument.

6.1.2. *Laboratory Instrument Calibration*

6.1.2.1. GC/MS for Volatiles and Semi-Volatiles Analysis

GC/MS will be used for analyses of volatile and semivolatile organic compounds. Mass spectral abundance criteria must be met prior to sample analyses. Decafluorotriphenylphosphine (DFTPP) for semivolatile organics and bromofluorobenzene (BFB) for volatile organics are used to verify instrument performance of the GC/MS system and must meet specific ion abundance criteria established in EPA SW-846 methods. Tests demonstrating that these criteria are being met must be made daily or after every 12 hours of sample analyses, whichever is more frequent. The instrument performance must also be verified whenever a corrective action to the GC/MS system affects the tuning (e.g., ion source cleaning or repair).

Initial calibration of the GC/MS system is accomplished with a minimum of five concentrations of target compounds. Relative response factors (RRFs) must be greater than or equal to 0.05. Relative standard deviations for the RRFs must be less than or equal to 30%. Initial calibration is not

valid if these criteria are not met. The relative retention times of each compound in each standard run must agree within 0.06 units.

The initial calibration is verified every 12-hour period with System Performance Check Compounds (SPCCs) and Calibration Check Compounds (CCCs). Continuing calibration RRFs are compared to the initial calibration's average RRF. The minimum RRF for SPCCs must be met. The relative standard deviation specified in SW-846 between the initial RRF and the CCC RRFs must be met for the initial calibration to be valid. Prior to sample analyses, the GC/MS system must be evaluated and corrective action taken if this criterion is not met.

6.1.2.2. GC for PCB Analysis

Gas chromatography will be used for analysis of PCBs (EPA SW8080). Initial calibration is performed when chromatographic conditions are changed (e.g., change in flow rate, detectors, new column) or as required in the EPA SW-846. For PCB analyses, a minimum of five external standards of different concentrations must be analyzed to determine the linearity of the gas chromatograph. Response factors for each compound are calculated (as specified in the methods) from the results, and a calibration curve generated. A quadratic curve may also be used.

EPA method SW8080 for PCB analyses requires that retention times be established and retention time windows be determined for the target compounds and surrogate compounds. The procedures and acceptance criteria for these analyses are established in the methods.

Performance evaluation mixtures and individual midpoint PCB standard mixtures are also analyzed at specified intervals as defined in EPA Method SW8080. The calibration factor for each standard is established in the methods.

The continued linearity of the gas chromatograph calibration is checked by analysis of a check standard after every 10 sample analyses. The response for any analyte must be within a 15% difference of the response from the initial calibration. If the percent difference exceeds this criterion, then the instrument is checked and a new calibration curve is performed before resumption of samples analyses.

6.1.2.3. Ignitability

Calibration for ignitability is performed by checking the flash point using a standard of xylene. The calibration is performed at the beginning and end of each sample run.

6.1.2.4. Colorimetry for Cyanide and Sulfide Analyses

Levels of cyanide and sulfide will be analyzed by spectrophotometric methods, which use a colorimeter to identify the analyte when the analyte is complexed with, or creates the formation of, a light-absorbing compound. Calibration of the colorimeter is accomplished with a minimum of three concentrations of standards and is performed when instrument conditions are changed or when the calibration standard exceeds acceptance criteria. The calibration curve is plotted, and a minimum correlation coefficient of 0.995 is required for acceptable linearity of the resulting calibration curve.

The initial calibration is verified with the analysis of a midrange calibration standard prior to sample analysis and for every 20 samples analyzed. The standard result must be less than or equal to a 15% difference from the response of the initial calibration. If this acceptance criterion is exceeded, then the instrument must be recalibrated.

6.1.2.5. AA for Inorganic Analysis

Calibration for the atomic absorption methods requires a minimum of three concentrations of standards and one blank, and a curve must be prepared for every *day* of continuous sample analysis. An independently prepared midrange check standard and reagent blank is analyzed per every 15 samples and must be within 20% of the initial curve.

6.1.2.6. ICP for Inorganic Analysis

Mixed calibration standards are prepared and verified according to EPA method 6010. Initial calibration is performed according to instrument manufacturers' specifications. A calibration blank is prepared to establish the calibration curve and analyzed after each ten samples. The results of the blank must be within 3 standard deviations of the mean blank value. An instrument midpoint check standard is analyzed every ten samples and must be within 10% of the expected value. The corrective actions specified in the method must be taken if this criterion is not met.

6.1.2.7. pH Meter Calibration

The pH meter is calibrated every 10 samples with a minimum of two pH standards (pH 4 and 7). Immediately after the initial calibration, the pH 4 standard is checked. If the standard is not within ± 0.1 units, the instrument is checked and re-calibrated.

6.1.2.8. GC for Alcohol Analysis:

Gas chromatography will be used for analysis of alcohol (EPA SW8015M). Initial calibration is performed when chromatographic conditions are changed (e.g., change in flow rate, detectors, new column) or as required in the EPA SW-846. For alcohol analyses, a minimum of five external standards of different concentrations must be analyzed to determine the linearity of the gas chromatograph. Response factors for each compound are calculated (as specified in the methods) from the results, and a calibration curve generated. A quadratic curve may also be used.

EPA method SW8015M for alcohol analyses requires that retention times be established and retention time windows be determined for the target compounds and surrogate compounds. The procedures and acceptance criteria for these analyses are established in the methods.

The continued linearity of the gas chromatograph calibration is checked by analysis of a check standard after every 10 sample analyses. The response for any analyte must be within a 15% difference of the response from the initial calibration. If the percent difference exceeds this criterion, then the instrument is checked and a new calibration curve is performed before resumption of samples analyses.

6.2. Sample Labeling/Preservation/Shipping

6.2.1. Sample Identification

Samples collected at the site must be uniquely labeled.

All samples will be identified with a label attached directly to the container. Sample label information will be completed using waterproof black ink. The labels will contain the following information:

- Sample number
- Time and date of collection
- Installation name
- Parameters to be analyzed
- Preservative (if any)
- Sample source/location
- Sampler's initials

For this project, the sample identification scheme shown in Table 6-1 will be used.

Table 6-1 - Sample Identification Scheme

FS-WXXX-Y-AZZZZ where:

Variable	Variable Definition
FS	Foundry Sales
W	Source Identification B - Building Sample D - Drum Sample U - Underground Storage Tank
XXX	Location Identification (3-digit number)
Y	Sample Matrix B - Building Material O - Oil W - Drum Waste
A	Quality Control Sample 1 - Field Duplicate (not required for this phase) 2 - Trip Blank 3 - Field Rinsate (not required for this phase)
ZZZZ	Sample Identification (4 digit number)

If an oil sample was collected from an underground storage tank and the storage tank had been designated as tank #1, then the sample Identification would be FS-U001-O-00001.

6.2.2. Sample Container Preservatives

The laboratory must use preservatives that are pre-measured reagents and purchased from suppliers. These preservatives must be received with QC documentation to verifying purity. These records shall be maintained by the laboratory and available for inspection. Refer to Table 6-2 for a listing of sample containers, preservatives, and the holding time that will be employed for the project.

Table 6-2 - Sample containers for Solid/Waste Samples

Analysis	Method	Container (Wide-Mouth)	Minimum Volume/ Weight ¹	Preservation	Holding Time ²
TCLP Analysis	SW1311	Glass bottle with Teflon® lined lid, no headspace	300 g	Cool 4° C	14 days
Alcohols	SW8015	Glass bottle with Teflon® lined lid	120 g	Cool 4° C	14 days
Volatile Organic	SW8240	Glass bottle with Teflon® lined lid	120 g	Cool 4° C	14 days
Semi-Volatile Organic	SW8270	Glass bottle with Teflon® lined lid	120 g	Cool 4° C	14 days/40 days
PCB	SW8080	Glass bottle with Teflon® lined lid	120 g 40 ml for oil	Cool 4° C	14 days/40 days
Inorganic (metals)	SW6010	Glass bottle with Teflon® lined lid	120 g	Cool 4° C	180 days
Ignitability	SW1010	Glass bottle with Teflon® lined lid	120 g	Cool 4° C	3 days
Corrosivity	SW1011				
pH	SW9040				
Reactive Cyanide	SW-846 Chapter 7.3	Plastic wide mouth bottle	50 g	Cool 4° C	14 days
Reactive Sulfide					
Asbestos (Bulk)	EPA600/R-93-116	Plastic Ziplock® Bag	Several pieces	N/A	N/A

Analysis	Method	Container (<i>Wide-Mouth</i>)	Minimum Volume/ Weight ¹	Preservation	Holding Time ²
Asbestos (PCM)	NIOSH 7400	Filter Cassette	N/A	N/A	N/A

¹Additional volume is required for MS/MSD or MS/Dup samples
²Holding times are based on verified date of sampling. The 40 day holding times apply to the time between extraction and analysis.

Table 6-2 - Sample containers for Water Samples

Analysis	Method	Container (<i>Wide-Mouth</i>)	Minimum Volume/ Weight ¹	Preservation	Holding Time ²
TCLP Analysis	SW1311	Glass Bottle with Teflon® lined lid, no headspace	6x 1 liter	Cool 4° C	14 days
Alcohols	SW8015M	Glass bottle with Teflon® lined lid	2 x 40 ml vials	Cool 4° C	14 days
Volatile Organic	SW8240	Glass bottle with Teflon® lined lid	2 x 40 ml vials	Cool 4° C pH<2 with HCl	14 days
Semi-Volatile Organic	SW8270	Glass bottle with Teflon® lined lid	2 - 1 liter	Cool 4° C	7 days/40 days
PCB	SW8080	Glass bottle with Teflon® lined lid	2 - 1 liter	Cool 4° C	7 days/40 days
Inorganic (metals)	SW6010	Polyethylene bottle	1 - liter	Cool 4° C pH<2 with HNO ₃	180 days
Ignitability Corrosivity pH	SW1010 SW1011 SW9040	Polyethylene bottle	1 - liter	Cool 4° C	3 days
Reactive Cyanide Reactive Sulfide	SW846 - Chapter 7.3	Polyethylene bottle	1-liter	pH<12 with NaOH Cool 4° C	14 days

¹Additional volume is required for MS/MSD or MS/Dup samples
²Holding times are based on verified date of sampling. The 40 day holding times apply to the time between extraction and analysis.

6.2.3. Sample Shipping

All samples collected and shipped for analysis as part of the removal efforts at the GH&R Foundry property in Dayton, Ohio will be considered hazardous samples and will be handled, packaged and shipped according to this designation. The United States Department of Transportation (DOT) and the International Air Transport Association (IATA) have established specific regulations governing the packaging of hazardous samples for shipment. These regulations include specifications for packing materials, shipping containers, and shipping labels. All samples will be shipped in accordance with these regulations based on the best available knowledge of the samples being collected.

6.3. Quality Control Samples

6.3.1. Field Quality Control Checks

All semi-quantitative field screening analyses will be made by field instruments which have been laboratory calibrated, and field checked daily against a quality control standard.

6.3.2. Laboratory Quality Control Checks

Internal quality control checks for the analyses are specified in the analytical methods and in Table 6-3 and Table 6-4. Additional quality control checks for some analyses will be performed and are also summarized in Table 6-3 and Table 6-4. The frequency of performance of such checks and the acceptance criteria for analyses results (as presented in Table 6-3 and Table 6-4) are based on guidelines in the analytical method and conform to established laboratory control limits.

Table 6-3 - Quality Control Requirements

Analysis	Sample Matrix	Field or Lab	QC Sample	QC Sample Frequency	Criteria
Volatiles SW8240	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	Not Required	N/A
			Trip Blank	Not Required	N/A
			TCLP Matrix Spike	1/matrix	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	See Table 6-4
			TCLP Matrix Spike	Per field team submission	N/A
			Calibration	5 pt. Calibration Curve per SW-846	Per SW-846
			SPCCs	1/12 hours	Per SW-846
			Continuing Calibrations Check	1/12 hours	Per SW-846
			Method Blank	1/batch or 1/12 hrs whichever is more frequent	See Table 6-4
			Internal Standards	Each Sample	See Table 6-4
			Laboratory Control Sample	1/20 samples or 1/batch whichever is more frequent	See Table 6-4
			Surrogate	Each sample	See Table 6-4
Alcohols SW8015	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	Not Required	N/A
			Trip Blank	Not Required	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	See Table 6-4
			Calibration	5 pt. Calibration per SW-846	Per SW-846
			Continuing Calibration	1/10 samples analyzed	%D < 15%
			Method Blank	1/batch or 1/20 samples whichever is more frequent	< PQL
			Laboratory Control Sample	1/batch or 1/20 samples whichever is more frequent	See Table 6-4
			Surrogate	Each sample	See Table 6-4

Analysis	Sample Matrix	Field or Lab	QC Sample	QC Sample Frequency	Criteria
Semi-Volatiles SW8270	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	Not Required	N/A
			TCLP Matrix Spike	1/matrix	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	See Table 6-4
			TCLP Matrix Spike	Per field team submission	N/A
			Calibration	5 pt. Calibration Curve per SW-846	Per SW-846
			SPCCs	1/12 hours	Per SW-846
			Continuing Calibrations Check	1/12 hours	Per SW-846
			Method Blank	1/batch or 1/12 hrs whichever is more frequent	< 5 times the PQL
			Internal Standards	Each Sample	See Table 6-4
			Laboratory Control Sample	1/20 samples or 1/batch whichever is more frequent	See Table 6-4
			Surrogate	Each sample	See Table 6-4
Pesticides/ PCBs SW8080	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	Not Required	N/A
			TCLP Matrix Spike	1/matrix	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	See Table 6-4
			TCLP Matrix Spike	Per field team submission	N/A
			Calibration	5 pt. Calibration Curve per SW-846	Per SW-846
			Continuing Calibrations Check	1/10 samples	Per SW-846
			Method Blank	1/batch or 1/12 hrs whichever is more frequent	< 5 times the PQL
			Laboratory Control Sample	1/20 samples or 1/batch whichever is more frequent	See Table 6-4
			Surrogate	Each sample	See Table 6-4
Inorganic (metals)	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	Not Required	N/A
			TCLP Matrix Spike	1/matrix	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	75% -125%
			TCLP Matrix Spike	Per field team submission	N/A
			Initial Calibration Verification (IVC)	Per SW-846	Per SW-846
			Continuing Calibration Verification	Per SW-846	Per SW-846
			Linear Range Check Standard	Per SW-846	Per SW-846
			Method Blank	1/batch or 1/12 hrs whichever is more frequent	< PQL
			Laboratory Control Sample	1/20 samples or 1/batch whichever is more frequent	See Table 6-4
			Inter-element correction	1/year or when instrument is adjusted	Per SW-846
			Linear Range Analysis	Per SW-846	Per SW-846

Analysis	Sample Matrix	Field or Lab	QC Sample	QC Sample Frequency	Criteria
Ignitability SW1010 Corrosivity SW1011	Water/Soil/ Waste	Field	Field Duplicate	1/10 samples or less collected	RPD < 50 percent
			Field Blank	1/20 samples or less collected	N/A
Cyanide Sulfide	Water/Soil/ Waste	Field	Field Duplicate	1/20 samples or less collected	N/A
			Field Blank	Not Required	N/A
			Matrix Spike/Matrix Spike Duplicate	1/20 samples or less collected	N/A
		Laboratory	Matrix Spike/Matrix Spike Duplicate	Per field team submission	N/A
			Initial calibration Curve	When instrument condition changes or Continuing Calibration fails	$r^2 > 0.995$
			Continuing Calibration	1/20 samples	%D < 15%
			Laboratory Control Sample	1 batch or 1/20 samples whichever is more frequent	80 - 120
pH SW9040		Laboratory	Duplicate	Per field team submission	RPD < 50 percent

Table 6-4 - Quality Control Check Requirements

Method	Spike Compound	Percent Spike Recovery		Relative Percent Difference	
		Water	Soil/Waste	Water	Soil/Waste
Volatiles - SW8240	Internal Surrogates				
	bromochloromethane	50 - 200 ¹	50 - 200 ¹	NA	NA
	1,4-difluorobenzene	50 - 200 ¹	50 - 200 ¹	NA	NA
	chlorobenzene-d5	50 - 200 ¹	50 - 200 ¹	NA	NA
	Surrogates				
	toluene-d8	88 - 110	81 - 117	NA	NA
	4-bromo-fluorobenzene	86 - 115	74 - 121	NA	NA
	1,2-dichloroethane-d4	76 - 114	70 - 121	NA	NA
	Matrix Spike/Laboratory Control Sample				
	1,1-DCE	61 - 145	59 - 172	30	50
Volatiles - SW8015	Surrogates				
	n-Butanol	50 - 150	50 - 150	NA	NA
Pesticides/ PCBs	Matrix Spike/Laboratory Control Sample				
	Methanol	50 - 150	50 - 150	50%	50%
	Surrogates				
	tetrachloro-m-xylene	60 - 150	60 - 150		
	decachlorobiphenyl	60 - 150	60 - 150		
	Matrix Spike				
	Aroclor-1248	50 - 150	50 - 150	50	50
	Lindane	not required	not required	NA	NA
	Heptachlor	not required	not required	NA	NA
	Aldrin	not required	not required	NA	NA
	Dieldrin	not required	not required	NA	NA
	Endrin	not required	not required	NA	NA
	4,4'-DDT	not required	not required	NA	NA

Method	Spike Compound	Percent Spike Recovery		Relative Percent Difference	
		Water	Soil/Waste	Water	Soil/Waste
Semi-volatiles SW8270	Internal Surrogates				
	1,4 dichlorobenzene-d4	50 - 200 ¹	50 - 200 ¹	NA	NA
	naphthalene-d8	50 - 200 ¹	50 - 200 ¹	NA	NA
	acenaphthene-d10	50 - 200 ¹	50 - 200 ¹	NA	NA
	phenanthrene-d10	50 - 200 ¹	50 - 200 ¹	NA	NA
	chrysene-d12	50 - 200 ¹	50 - 200 ¹	NA	NA
	perylene-d12	50 - 200 ¹	50 - 200 ¹	NA	NA
	Surrogates				
	Nitrobenzene-d5	35 - 114	23 - 120	NA	NA
	2-fluorobiphenyl	43 - 116	30 - 115	NA	NA
	p-terphenyl-d14	33 - 141	18 - 137	NA	NA
	phenol-d6	10 - 94	24 - 113	NA	NA
	2-fluorophenol	21 - 100	25 - 121	NA	NA
	2,4,6-tribromophenol	10 - 123	19 - 122	NA	NA
	Matrix Spike/Laboratory Control Sample				
	Phenol	12 - 110	26 - 90	50	50
	2-chlorophenol	27 - 123	25 - 102	50	50
	1,4-dichlorobenzene	36 - 97	28 - 104	50	50
	N-nitrosodiphenylamine	41 - 116	41 - 126	50	50
	1,2,4-trichlorobenzene	39 - 98	38 - 107	50	50
	4-chloro-3-methylphenol	23 - 97	26 - 103	50	50
	acenaphthene	46 - 118	31 - 137	50	50
	4-nitrophenol	10 - 80	11 - 114	50	50
	2,4-dinitrotoluene	24 - 98	28 - 89	50	50
	phentachlorophenol	9 - 103	17 - 109	50	50
	pyrene	26 - 127	35 - 142	50	50

The internal quality checks for chemical laboratory analyses that will be used in this program are described below:

Method Blank. The method blank is an artificial sample designed to monitor artifacts that may be introduced into the sample during sample preparation or analysis. For analyses of aqueous samples, reagent water is generally used as the method blank matrix. For analyses of solid samples, a purified solid matrix is used. The method blank is carried through the entire analytical scheme (extraction, concentration, and analysis). Method blanks will be performed for all applicable analyses at a frequency stated for the analytical method in Table 6-3. For metals analyses, the method blank is referred to as the preparation blank.

Sulfur Cleanup Blank. When sample extracts for PCB analyses require a sulfur cleanup, a sulfur cleanup blank is performed. This method blank monitors for contamination from the sulfur cleanup steps.

Instrument Blank. For PCB analyses, reagent is analyzed to verify that the gas chromatograph is free of contaminants.

Method Spike/Blank Spike. A method spike is a method blank sample with a known amount of standard added that is carried through the same process as the samples to be analyzed. The spike result of the blank spike sample provides information on method spike performance. This quality

control check is performed is part of the drinking water method for volatile organic analyses.

Matrix Spike. Predetermined quantities of specific analytes are added to a sample matrix prior to sample extraction or digestion. Percent recoveries are calculated for each analyte to assess the accuracy of the analyses. Matrix spikes monitor the effects of the sample matrix on the analytical results. One matrix spike for every 20 samples collected will be performed for all applicable analyses (analyses of volatile organics, semivolatile organics, metals). The field samples to spike will be selected by field personnel and will not include field blank samples (trip blanks and equipment blanks). This will ensure that a sample matrix with possible analyte detections will be spiked to obtain representative results of analytical accuracy.

Matrix Spike Duplicate. Primary and duplicate matrix spikes will be performed on the same field sample. The matrix spike duplicate will assess the analytical and sampling precision by calculating a relative percent difference (RPD) between the primary and duplicate spike recoveries.

Surrogate Spike. Surrogate compounds are organic compounds that are similar to analytes of interest in terms of their chemical composition and extraction and chromatographic properties, but that are not normally found in environmental samples. These compounds are spiked into all field and laboratory quality control samples (blanks, standards, and matrix spikes) for volatile organic, semivolatile organic, and PCB analyses. Percent recoveries are calculated for each surrogate compound in each sample. These recoveries give an indication of the performance of the analytical method.

Replicate Sample. To assess the precision of the analytical method for given analyses, a replicate sample is analyzed by taking aliquots from a sample container, and an RPD is calculated for the results of the analyses of the primary sample and the replicate sample from the same container. Such replicate samples will be analyzed for metals. Field personnel will select the metals sample to be analyzed as a replicate.

Instrument Performance Check. GC/MS analyses require that the mass spectrometer be tuned prior to calibration and sample analysis. This is accomplished with analysis of a compound with properties similar to analytes of interest but that is not commonly found in the environment. For tunings and mass calibration, BFB, DFTPP, and PFK will be used for volatile organic and semivolatile organic GC/MS analyses. Specific ion abundance criteria must be met, as defined in the appropriate method, before sample analyses begin.

Initial Calibration. An instrument is calibrated initially with a series of standards at predetermined concentrations to identify the response factor of the instrument over the given concentration range. This calibration is performed for most instruments when there has been a change in instrument conditions or when the continuing calibration check result is outside a defined acceptance criterion.

Calibration Check. The initial instrument calibration is verified at regular intervals to account for potential instrument drift or other changes in instrument conditions. A standard with a concentration within the calibration range is analyzed after every 10 sample analyses or at a frequency defined in the analytical method. The standard result is compared to the initial calibration, and a percent difference or RPD is calculated. If the result is not within the established acceptance criterion range, then the analytical system is evaluated and recalibrated before resumption of sample analyses. For metal analyses, samples analyzed since the last acceptable standard must be reanalyzed.

Retention Time Window. Retention times of target analytes for GC, GC/MS, and HPLC analyses must be monitored for shifts during sample analyses. The allowed shift of retention time for a given analyte is called the retention time window. Retention time windows are established according to the analytical method. Acceptance criteria are expressed as an established range (e.g., ± 0.06 units) or, for pesticides analyses, as plus or minus three times the standard deviation of three retention times of the same analyte. Shifts that occur outside the acceptance criteria indicate a change in the chromatographic system or an instrument problem, and could lead to misidentifications unless corrective action is taken.

Internal Standard. Internal standards are performed for volatile and semivolatile GC/MS analyses and are used to ensure that system sensitivity and response are stable throughout all analyses. Internal standards are compounds similar in analytical behavior to the analytes that are added to the calibration standards. Response factors of these standards are used to quantitate sample results. Criteria for internal standard responses and retention times are defined in the analytical methods.

Initial and Continuing Calibration Blanks (ICB, CCB). A blank consisting of reagent water is analyzed immediately after every initial and continuing calibration verification for metal analyses, and after completing every 10% of the sample analyses to be performed for each batch of samples or after every 2 hours, whichever is more frequent.

Laboratory Control Sample (LCS). An LCS is a standard solution of a certified concentration prepared by a source external to the laboratory performing the analysis that is used to measure analytical accuracy. This

quality control check is performed for metals, volatiles, semivolatiles, and PCBs analyses for every batch of analytical samples. The recovery of the LCS analysis for metals must be within 80 to 120%. Manufacturers' specifications for acceptance criteria for the LCS are used for analyses of other matrices.

Initial Calibration Verification (ICV). After the ICP and AA, and cyanide systems are calibrated, the accuracies of the initial calibrations are verified with analyses of calibration verification standards. Control limits have been established for each system (ICP and AA: 90 to 110% of the true value; AA—cold vapor for mercury: 80 to 120% of true value, and cyanide: 85 to 115% of true value). If a control limit is exceeded, then the problem causing this deviation must be identified and corrected, and the instrument recalibrated.

Continuing Calibration Verification (CCV). The initial calibrations of ICP, AA, and cyanide systems must be verified during each set of analyses after completing every 10% of the analyses to be performed for each batch of samples or after every 2 hours, whichever is more frequent. The standard solutions to be used for such continuing calibrations will be either EPA solutions, National Bureau of Standards SRM1643a solutions, or contractor-prepared standards according to the analytical method. Control limits for these analyses are the same as for ICV analyses.

Interference Check Sample (ICS). An interference check sample (ICS) is analyzed for the ICP analysis at a frequency defined in the CLP SOW to verify interelement and background correction factors. The ICS consists of one solution containing interferences, and a second containing analytes mixed with the interferences. The second solution must fall within $\pm 20\%$ of the true value. Corrective action must be taken if this criterion is not met.

ICP Serial Dilution (L). A serial dilution analysis is a comparison of the results of a series of analyses of different dilutions of a given sample. An ICP serial dilution analysis is performed on one sample from each group of samples of similar matrices and concentrations or on one sample from each sample delivery group, whichever is more frequent, as defined in the SW-846. Results of this series of analyses must agree within 10%. The results of serial dilution analyses may indicate the presence of potential chemical or physical interferences in the analytical process.

Linear Range Analysis (LRA). The linear range for ICP analyses is checked with a standard quarterly. The standard is analyzed in a routine analytical run. The results must be within $\pm 5\%$ of the true value. The concentration of the standard is the upper limit of the ICP linear range.

Interelement Corrections. ICP interelement correction factors are determined prior to the start of analyses and at least annually. Interelement

corrections for spectral interference due to aluminum, calcium, iron, and magnesium are checked for all wavelengths used for each analyte.

Secondary Column Confirmation. For gas chromatographic analyses, a GC column with a different coating or packing is used as a second analysis for all samples with detections in the primary analysis. This second analysis confirms the presence or absence of the detected analyte.

Performance Evaluation Sample. For this check, samples are prepared externally to the laboratory to assess the ability of the laboratory to accurately perform relevant analyses. The samples are prepared with known concentrations of analytes of interest.

Qualitative Verification. The sample mass spectrum must be compared to the mass spectrum of a standard of a suspected compound. The criteria to be met for proper identification are discussed in the EPA SW8270, SW8240, and SW8260.

System Performance Check Compounds (SPCCs). SPCCs are specific compounds used to monitor the RRFs of continuing calibration checks as compared to the initial calibration for GC/MS analyses of volatile and semivolatile organic compounds. A minimum RRF for each of the SPCCs must be achieved in order for the initial calibration to be valid.

Calibration Check Compounds (CCCs). CCCs are specific compounds used to monitor the RRFs of continuing calibration checks as compared to the initial calibration for GC/MS analyses of volatile and semivolatile organic compounds. A relative standard deviation of the RRFs for each compound must be met in order for the initial calibration to be valid, as defined in the method.

6.4. Sample Handling Procedures

6.4.1. Sample Custody

Chain-of-custody procedures document the historical possession of sample containers and samples, sample extracts and sample digestates. The associated documentation provides traceability of sample containers from the time of sample collection through shipment, storage, analysis and disposal of the sample. Custody, as defined by this document, refers to when a sample is:

- In someone's actual possession, or
- In someone's view, after being in their physical possession, or
- In someone's possession previously and then locked, sealed or secured in a manner which prevents unsuspected tampering, or

- Placed in a designated and secured area.

6.4.1.1. Field Chain of Custody Records

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a chain-of-custody record (Figure 6-1) will be completed for each sample as it is collected by the field team member. Each time the samples are transferred, the signatures of the persons relinquishing and receiving the samples, as well as the date and time of transfer, will be documented on the chain-of-custody record.

Chain-of-custody seals are used to determine if any tampering has occurred during shipment of samples. These signed and dated seals will be placed at the junction between the lid and the jar or cooler on all project sample containers and shipment containers (coolers) by the person responsible for packaging. If the coolers or jars are opened before receipt at the laboratory, the seals will not be intact. If the chain-of-custody seals are not intact, the laboratory project will notify the WESTON Project Manager within 24 hours of receipt of the container. The WESTON field manager will then complete a corrective action report (discussed in Section 6.7 of this SAP).

Example Chain-of-Custody Form

Figure 6-1

6.4.1.2. Laboratory Custody Procedures

The designated sample custodian(s) and staff are responsible for samples received at the laboratory. In addition to receiving samples, the sample receipt staff is also responsible for documentation of sample receipt and storage before and after sample analysis. A summary of the minimal laboratory receipt procedures follows.

Upon receipt, the sample custodian signs, dates, and documents the time of sample receipt on the air bills or other shipping manifests received from the couriers. The sample custodian signs the chain-of-custody assuming custody of the samples. If a chain-of-custody is not received with a set of samples, the WESTON Project Manager will be immediately notified by the laboratory. The sample custodian inspects the sample cooler for integrity and then documents the following information: the type of courier, shipped or hand delivered (copies of the airbills are maintained); availability and condition of custody information; sample temperature ambient or chilled; actual temperature if requested for project; the presence of leaking or broken containers; and indication of sample preservation.

Additionally, the sample holding time and date collected are checked. If a sample has exceeded holding time, then the WESTON Project Manager will be notified.

The sample custodian or designee matches the sample container information (e.g., sample tag/label), chain-of-custody records, and all pertinent information associated with the sample. The sample custodian then verifies sample identity to assure that all information is correct. Any inconsistencies are resolved with the WESTON through the laboratory project manager and corrective action measures are documented before sample analysis proceeds.

6.4.2. Laboratory Sample Storage

Cooler storage is designed to segregate samples in such a way as to minimize the possibility of cross-contamination. This includes the storage of volatile samples separate from semi-volatiles and inorganic samples.

Within laboratory production units, refrigerators and freezers are used for storing analytical standards and sample extracts. Within the refrigerators or freezers, standards are stored by an internal identification number for easy retrieval. Standards are stored separately from samples.

Access to laboratory facilities is restricted to laboratory personnel or escorted guests. Therefore, once sample possession is relinquished to the

laboratory, the sample is in a designated secure area (e.g., the laboratory facility) accessible only to authorized personnel.

6.4.3. *Laboratory Record Keeping*

All data related to sample preparation, analysis, and general observations are recorded in appropriate hard-bound laboratory notebooks. Laboratory notebook pages are reviewed, signed and dated by the author and receive a independent secondary review by a peer or supervisor who signs/initials and dates the data pages.

Corrections to notebook entries are made by drawing a single line through the erroneous entry and writing the correct entry next to the one crossed out. All corrections are initialed and dated by the individual performing the correction.

6.5. **Laboratory QA/QC**

6.5.1. *Precision*

Precision is the level of agreement among repeated independent measurements of the same characteristic, usually under a prescribed set of conditions (e.g., under the same analytical protocol). The most commonly used estimates of precision are the relative percent difference (RPD) for cases in which only two measurements are available, and the percent relative standard deviation (%RSD) when three or more measurements are available. In both cases, the quantitative measure of the variability of the group of measurements is compared with their average value. This is especially useful in normalizing environmental measurements to determine acceptability ranges for precision, since it effectively corrects for the wide variability in sample analyte concentration indigenous to samples.

Precision is represented as the RPD between measurement of an analyte in duplicate samples or in duplicate spikes. RPD is defined as follows:

$$RPD = \frac{|C_1 - C_2|}{\frac{C_1 + C_2}{2}} \times 100$$

Where:

C_1 = first measurement value

C_2 = second measurement value

The % RSD is calculated by the standard deviation of the analytical results of the replicate determinations relative to the average of those results for a

given analyte. This method of precision measurement can be expressed by the formula:

$$\% RSD = \frac{\sqrt{\frac{\sum_{i=1}^N (RF_i - \overline{RF})^2}{N-1}}}{\overline{RF}} \times 100$$

Where:

RF = response factor

N = Number of measurements

Precision control limits for evaluation of sample results are established by the analysis of control samples. The control samples can be method blanks fortified with surrogates (e.g., for organics), or laboratory control samples (LCS) purchased commercially or prepared at the laboratory. The LCS is typically identified as blank spikes (BS) for organic analyses. For multi-analyte methods, the LCS or BS may only contain a representative number of target analytes rather than the full list.

The RPD for duplicate investigative sample analysis provides a tool for evaluating how well the method performed for the respective matrix. Table 6-3 summarize the frequency with which quality control samples must be introduced and the Table 6-4 specifies recovery limits.

In a few instances, quality control samples to evaluate precision were not included. These samples were purposefully excluded because the data was being collected for qualitative purposes or because the action limit was far above the laboratory reporting limit.

6.5.2. Accuracy

Accuracy is the degree of agreement of an analytical measurement with the true or expected concentration. When applied to a set of observed values, accuracy will be a measure of both random error and systematic error (bias).

Bias is systematic error inherent in an analysis caused by some artifact of the measurement system or deviation from protocol. Temperature effects and extraction inefficiencies are examples of the first kind; contamination, mechanical losses, and calibration errors are examples of the latter kind.

Accuracy control limits are established by the analysis of control samples, which are water and/or solid/waste matrices. The control sample can be a

method blank fortified with surrogates (e.g., for organics), or LCS purchased commercially or prepared at the laboratory. The LCS is typically a BS for organic analysis.

For multi-analyte methods, the LCS may only contain a representative number of target analytes rather than the full list.

For organic analyses the LCS may be surrogate compounds in the blank or a select number of target analytes in the blank spike. The LCS is subjected to all sample preparation steps. When available, a solid LCS may be analyzed to demonstrate control of the analysis for soil. The amount of each analyte recovered in a LCS analysis is recorded and entered into a database to generate statistical control limits. These empirical data are compared with available method reference criteria and available databases to establish control criteria.

The percent recovery (% R) for spiked investigative sample analysis (e.g., matrix spike) provides a tool for evaluating how well the method worked for the respective matrix. These values are used by the client to assess a reported result within the context of the project DQOs. For results outside control limits provided as requirements in the QAPP, corrective action appropriate to the project will be taken and the deviation will be noted in the case narrative accompanying the sample results. Percent recovery is defined as follows:

$$\% R = \frac{(A_T - A_0)}{A_F} \times 100$$

Where:

A_T = Total amount recovered in fortified sample

A_0 = Amount recovered in unfortified sample

A_F = Amount added to sample

Accuracy for some procedures is evaluated as the degree of agreement between a new set of results and a historical database or a table of acceptable criteria for a given parameter. This is measured as percent difference (%D) from the reference value, and is primarily used by the laboratory as a means for documenting acceptability of continuing calibration.

The percent difference (%D) is calculated by expressing as a percentage, the difference between the original value and new value relative to the original value. This method for precision measurement can be expressed by the formula:

$$\%D = \frac{|C_1 - C_2|}{C_1} \times 100$$

Where:

C_1 = concentration of analyte in the initial aliquot of the sample
 C_2 = concentration of analyte in replicate

The accuracy requirements for this project are specified in Table 6-4

6.5.3. *Completeness*

Completeness is a measure of the relative number of analytical data points which meet all the acceptance criteria for accuracy, precision, and any other criteria required by the specific analytical methods. Project specific completeness goals account for all aspects of sample handling, from collection through data reporting. The level of completeness can be affected by loss or breakage of samples during transport, as well as external problems which prohibit collection of the sample. An example for calculating analytical completeness is as follows:

$$\text{Completeness} = \frac{A}{B} \times 100$$

Where:

A = Number of usable data points (per analysis)
 B = Total number of data points collected (per analysis)

The ability to meet or exceed completeness objectives is also dependent on the nature of samples submitted for analysis. For example, if the analytical methods proposed for use (particularly for organics analyses) are intended for analysis of environmental samples of low and medium hazard, the applicability of these methods to non-routine matrices such as drum samples, wipes, air samples, etc., may result in poor method performance and therefore adversely impact on achievement of the data completeness goal. For this removal project, all the data must be assessed usable. Unusable data points must be re-collected and re-analyzed as necessary.

6.5.4. *Representativeness*

Representativeness expresses the degree to which data accurately and precisely represent characteristics of a population, parameter, variation at a sample point, process condition, or environmental condition. Data

representativeness for this project is accomplished through implementing approved sampling procedures and analytical methods which are appropriate for the intended data uses.

6.5.5. Comparability

Comparability expresses the confidence with which one data set can be compared to another. Comparability of data sets generated for this project will be obtained through the implementation of standard sampling and analysis procedures, by the use of traceable reference materials for laboratory standards, and by expressing the results in comparable concentration units. The methods for sampling and analysis are specified in sections 3 and 4 of this plan.

6.6. Documentation

6.6.1. Field Logbooks

All sample collection activities performed at the site will be documented, using waterproof, nonerasable black ink, either in a bound field notebook or on a data form. During sampling, the following information will be entered into the field notebook:

- The sample location;
- The sample identification number;
- The date and time the sample was collected;
- The sample matrix and a simple description of the matrix;
- Any unusual sample characteristics; and
- The parameters for analysis.

6.6.1.1. Corrections to Documentation

Corrections to notebook entries will be made by drawing a single line through the erroneous entry and writing the correct entry next to the one crossed out. All corrections will be initialed and dated by the individual performing the correction.

6.6.2. Chain of Custody

A chain of custody form (COC) as described in section 6.4 will be filled out by the field team member, and will accompany each shipment of samples to the laboratory. Upon receipt of the samples, the laboratory representative will sign and date the COC, and will follow the sample custody procedures outlined in section 6.4. Any changes, observations, or deficiencies in the COC or its contents will be noted directly on the COC, dated, and initialed by the laboratory representative. A copy of the signed COC will accompany results of the analyses. Any deviation or deficiency

from the expected custody procedures will be reported to the WESTON Project Manager, and corrective measures will be taken.

6.6.3. *Variances*

Any deviation or variance from the details of the work plan or this SAP will require documentation of the variance, and a record of the corrective steps taken. Documentation will be in the form of a completed corrective action form as described in section 6.7.3 of this SAP.

6.6.4. *Reports*

Three types of reports will be generated during the Foundry Sales project: Corrective Action Reports, an Audit Report, and a Final Summary Report. The Final Summary Report will include a summary of the sample result data review, the corrective actions taken during the project, and a copy of the audit report.

6.7. *QA/QC Audit*

6.7.1. *Field Performance Audits*

At least one field performance audit will be performed during the project. If the project continues for more than six months, or the field team changes (more than 30 percent of the team members are replaced), then additional audits will be performed. The audit will be performed by the WESTON Project Manager using a checklist derived from reviewing the contractual and regulatory requirements specified in the Work Plan which includes the Health and Safety Plan and this SAP.

At the completion of each audit, the Project Manager will submit a report to the project file. The report will be included with the final report as a record of project quality. If a problem is identified during the audit that impacts the usability of the data, then the problem will be documented using a corrective action report. If only minor problems are identified, the audit report will serve as documentation of the problems and a memo describing the corrective actions taken for these problems will be submitted to the project file and included in the final report.

6.7.2. *Laboratory Performance Audits*

No laboratory audits will be performed in support of this project. As an assurance of the laboratories ability to meet the project requirements, the chemistry laboratory will be actively participating in the USEPA Water Pollution (WP) Study and have accurately reported 80 percent of the target analytes in the latest WP study. The Asbestos laboratory will be accredited by the National Voluntary Lab Accreditation Program and American

Industrial Hygiene Association (AIHA) will be actively participating in the Proficiency Testing of each including PAT rounds. Both laboratories will be able to provide evidence of internal surveillance systems.

6.7.3. *Corrective Actions*

6.7.3.1. Laboratory Corrective Action

The subcontracted laboratory will have a quality system in place that includes a deficiency reporting system. The deficiency reporting system will include documenting the deficiency, implementing both immediate and long term corrective actions, and notifying the WESTON Project Manager of deficiencies that impact Foundry Sales samples.

6.7.3.2. WESTON Corrective Action Reports

When an employee identifies an error or a decision is made to deviate from the Work Plan, the Project manager must be notified and the employee must create a corrective action report, Figure 6-2. No deviation from the Work Plan shall occur prior to U.S. EPA approval. If a corrective action report is to be filled out, the employee is responsible for completing the Task Name, Internal Project Number, Project Manager, Initiator, Date Initiated, Requirement, and the Finding/Observation. Requirement on the form is used to describe the condition or specification which was violated. The Finding/Observation describes how the requirement was violated. If the employee takes an action to correct the error, the remedial corrective action section of the report must also be completed, as in the following:

The QAPP states "All soil samples will be collected using a stainless steel scoop and placed in a glass bottle." During the sampling event, the field technician used a steel shovel and placed the sample into a glass bottle. In this situation, the Requirement Finding/Observation, and corrective action sections of the form would be completed as:

Requirement: According to the QAPP, all soil samples should be collected using a stainless steel scope.
Finding/Observation: Ten samples were collected using a steel shovel. The ten samples are listed on the attached sheet.
Corrective Action for Incident: The error was identified after the 10 th sample was collected, and all field technicians were told to use a stainless steel scoop. The laboratory was directed by Jane Doe to not analyze the affected samples on March 10, 1996. The samples will be recollected.

The completed corrective action must be submitted to the Project Manager.

Figure 6-2

Corrective Action Report

Foundry Sales Nonconformance/Corrective Action Report	
Task Name: Internal	Initiator:
Project Number:	File Code:
Project Manager:	Date Initiated:
CAR No:	Revision:
Requirement:	
Finding/Observation:	
Corrective Action for Incident:	
Initiator of Corrective Action: _____ Date _____	
Root Cause:	
Corrective Action to Prevent Recurrence:	
Initiator of Corrective Action: _____ Date _____	
Rejected By: _____ Date Rejected: _____	
Verifications/Approvals:	
Project Manager:	Date:

The Project Manager is responsible for reviewing each of the corrective actions and verifying that the report is complete and that the remedial corrective action is appropriate. If a remedial correction action has not been implemented, then the Project Manager will identify what corrective action is required. The Project Manager will also determine what actions can be taken to prevent recurrence by identifying the root cause and implementing a preventive corrective action. An example of a possible root cause and preventive corrective action for the previous example might be:

Root Cause: The field technician accidentally picked up a draft copy of the sampling plan. The draft copy of the sampling plan specified samples must be collected with steel shovels.

Corrective Action to Prevent Recurrence: Prior to this incident, draft copies were not collected back from the copy holders. The document distribution system has been revised to ensure that draft documents are returned when the final version of a document is distributed. Additionally, we have implemented a checklist for field team leaders to ensure properly documents are in use and the proper procedures are being followed.

When the Project Manager completes the report, he will assign a tracking number (CAR No.) to the report and record the report on a project specific tracking sheet, Figure 6-3. The tracking number is simply a sequential number assigned to the report. An example of a completed log entry is as follows:

CAR No.	Date	Description	Impact on Date
001	10-Mar-96	A steel shovel was used to collect 10 samples instead of a stainless steel scoop.	The samples were re-collected and the data quality was not impacted.

When the project has been completed, the corrective action log and corrective actions are part of the client deliverables.

Figure 6-3

Project Specific Tracking Sheet

Foundry Sales Corrective Action Report Log			
CAR No.	Date	Description	Impact on Data

7. HEALTH AND SAFETY

Site workers must be appropriately trained for the work to be performed at the GH&R Foundry property. Workers must implement the health and safety procedures outlined for the task in the site Health and Safety Plan (HASP). The HASP provides specific guidance for safe conduct of operations at the Foundry site. The Project Manager will be responsible for proper implementation of, and adherence to the site HASP requirements, and review of subcontractor certifications and training records. All hazards associated with the work to be performed at the site, and the protective measures to be instituted for the task will be relayed to the subcontractors prior to starting work at the site. The HASP is included as Attachment B to the Work Plan.

APPENDIX B

Site-Specific Health and Safety Plan

SITE HEALTH AND SAFETY PLAN (HASP)

Prepared by:

W.O. Number: 11688-001-001-0100-00 Date: 2/97

Project Identification: GHR Foundry

Division:

Department/Office: CIN

Site Name: GHR Foundry

Client:

Work Location Address: 400 DETRICK St
Dayton, OH

Site History: (describe briefly) Partially Demolished Foundry on 11 Acre Site. PRODUCED STEEL FROM APPROXIMATELY 1948 TO 1983.

Scope of Work: (describe briefly) Oversight of fence installation to secure site. ADDITIONAL FURTHER CLEAN-UP AND REMOVAL ACTIVITIES TO BE PERFORMED WILL BE AMENDED TO THIS HASP AS THEY ARE SCHEDULED

Site visit only; site HASP not necessary. List personnel here and sign off below:

Regulatory Status:

Site regulatory status:

CERCLA/SARA

RCRA

Other Federal Agency

☒ US EPA

☐ US EPA

☐ DOE

☐ State

☐ State

☐ USACE

☐ NPL Site

NRC

☐ Air Force

OSHA

☐ 10 CFR 20

☐

☒ Hazard Communication (Req'd See Attachment "D")

☒ 1910

☒ 1926

☐ State

☒ Safety Officer Manual (Required to be On Site)

Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test

☐

☐ Air Emissions

☐

☐ Asbestos

☐

☐ Industrial Hygiene

☐

☐

☐

Review and Approval Documentation:

Reviewed by:

DSO/RSO/CHS

KEVIN BATE

Name (Print)

Other

Name (Print)

APPROVALS GRANTED ON TASK-BY-TASK BASIS - SEE FOLLOWING SIGNATURES

Signature

Date:

Signature

Date:

Approved by:

Project Director/

Project Manager

BRAD WHITE

Name (Print)

Signature

Date:

Hazard Assessment and Equipment Selection:

In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910.132 at the site prior to personnel beginning work the SHCS and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to Safety Officer Manual Section 2 Personal Protection Program for Guidance)

☒ SHCS ☐ Site Manager

Name (Print)

Signature

Date:

Project start date:

End date:

2/21/97

January 1998

This site HASP must be reissued/reapproved for any activities conducted after:

Date:

8/28/97

Amendment date(s):

By:

- 1.
- 2.
- 3.
- 4.
- 5.

WESTEN

FOUNDARY SALES TASK APPROVAL

TASK 1: FENCE INSTALLATION

NAME: [Signature]
 PM [Signature]
 3/5/97
KEVIN BATE
 RSO

SIGNATURE: [Signature]
 3/5/97
 PM [Signature]
 3/5/97
KEVIN BATE 2-25-97
 RSO DATE

TASK 2: DEBRIS REMOVAL

[Signature]
 PM
KEVIN BATE
 RSO

[Signature]
 PM DATE
KEVIN BATE 2-21-97
 RSO DATE

TASK 3 A: ASBESTOS INSPECTION

[Signature]
 PM
KEVIN BATE
 RSO

[Signature]
 PM DATE
KEVIN BATE 2-21-97
 RSO DATE

TASK 3 B: ASBESTOS ABATEMENT

 PM

 RSO

 PM DATE

 RSO DATE

WESTON

TASK 4: PCB REMOVAL

NAME:

SIGNATURE:

PM_____
PM_____
DATE_____
PSO_____
PSO_____
DATE

TASK 5: UST / Drum CONTENTS REMOVAL

PM_____
PSO_____
DATE_____
PSO_____
PSO_____
DATE

WESTON REPRESENTATIVES

Organization/Branch	Name/Title	Address	Telephone
Weston/CIN	Karen Arthur Assoc. Engr.	11840-D Kempsprings Dr Cincinnati, OH	513-825-3440
WESTON/CIN	BRAD WHITE PROS. MGR.	"	"
WESTON/CIN	JAMES BARTLEY PROS. DIRECTOR	"	"

Roles and Responsibilities: PROVIDE OVERSIGHT OF ACTIVITIES TO ENSURE THEY ARE PERFORMED ON SITE BY THE SUB CONTRACTOR AND WESTON TECHNICAL PERSONNEL.

WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone
TO BE DETERMINED			

Roles and Responsibilities:

SITE SPECIFIC HEALTH AND SAFETY PERSONNEL

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Karen Arthur

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120

Qualifications: Site Health and Safety Coordinator Training; Current Medical; 40 hr OSHA CFR 1910.120; 1st Aid; CPR; Current APR fit test; current refresher (8-Hr); Level D Supervisor (D-S)

Designated alternates include: Steve Berry, D-S; Kevin Bate, B-S; Julie Schucker, D-S; Michael May, B-S; Scott Pinner, C-S; Mike Szabo, D-S.

HEALTH AND SAFETY EVALUATION

Hazard Assessment

Background Review:

☒ Complete

☐ Partial

If partial why?

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1	fence installation	Install Security fencing	Feb 96
2	Debris Removal	Remove demolition debris	Feb 96
3	Asbestos Abatement	Inspect and Remove ACM	Feb-Mar 96
4	ACB Removal	Drain/Pump Transformers/Capacitors	Feb 96
5	UST _A Contents Removal	Pump out contents	Feb 96
	/drum		

Types of Hazards:

☐ Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.

Physicochemical [1] <input checked="" type="checkbox"/> Flammable <input type="checkbox"/> Explosive <input checked="" type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> O ₂ Rich <input type="checkbox"/> O ₂ Deficient	Chemically Toxic [1] <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Carcinogen <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Mutagen <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Teratogen <input checked="" type="checkbox"/> Absorption <input checked="" type="checkbox"/> OSHA 1910.1000 Substance (Air Contaminants) <input checked="" type="checkbox"/> OSHA Specific Hazard Substance Standard (Refer to HAZP Form O4-HASP.884 for Listing.)	Radiation [3] Ionizing: <input type="checkbox"/> Internal exposure <input type="checkbox"/> External exposure Non-ionizing: <input checked="" type="checkbox"/> UV <input type="checkbox"/> IR <input type="checkbox"/> RF <input type="checkbox"/> MicroW <input type="checkbox"/> Laser	Biological [2] <input type="checkbox"/> Etiological Agent <input checked="" type="checkbox"/> Other (Plant, insect, animal) <input checked="" type="checkbox"/> Physical Hazards [4] <input checked="" type="checkbox"/> Construction Activities
--	---	---	---

Source/Location of Contaminants and Hazardous Substances

Directly Related to Tasks

- ☐ Air
☒ Other Surface - asbestos
☐ Groundwater
☒ Soil
☐ Surface Water
☐ Sanitary Wastewater
☐ Process Wastewater
☒ Other Storage Containers

Indirectly Related to Tasks - Nearby Process(es) That Could Affect Team Members:

- ☐ Client Facility
☒ Nearby Non-client Facility - Train tracks immediately behind facility may pose noise problems
 Describe:
 - Workers must know emergency signals and alarm procedures.
☐ Client Briefing Arranged

#

HEALTH AND SAFETY EVALUATION - 2 BIOLOGICAL HAZARDS OF CONCERN

☒ Poisonous Plants (FLD 43)

Location/Task No(s): ALL

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No TBA

Immunization required: ☐ Yes ☐ No

☒ Insects (FLD 43)

Location/Task No(s): ALL

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No TBA

Immunization required: ☐ Yes ☐ No

☒ Snakes, Reptiles (FLD 43)

Location/Task No(s): ALL

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No TBA

Immunization required: ☐ Yes ☐ No

☒ Animals (FLD 43)

Location/Task No(s): ALL

Source: ☐ Known ☒ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☒ Contact ☒ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No TBA

Immunization required: ☐ Yes ☐ No

FLD 43 - WESTON Biohazard Field Operating Procedures: Att. OP ☐

☐ Sewage N/A

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

Tetanus Vaccination within Past 7 yrs: ☐ Yes ☐ No
(see Note #1 below)

☐ Etiologic Agents (List) N/A

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion
☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

FLD 44 - WESTON Bloodborne Pathogens Exposure Control Plan - First Aid Procedures: Att. OP ☒ BBP PLAN

FLD 45 - WESTON Bloodborne Pathogens Exposure Control Plan - Working with Infectious Waste: Att. OP ☐

Note #1: A tetanus injection is recommended every 10 years for employees with "normal exposure risks." However, if employees have frequent potential for exposure at "higher risk," as working with raw sewage, then a frequency of 7 years is recommended.

* TBA = TO BE DETERMINED BY SHSC PRIOR
TO START OF WORK

A black and white photograph showing a large group of people, likely soldiers, standing in formation on a field. The image is very dark and grainy, with high contrast, making individual details difficult to discern. The figures appear to be arranged in rows, possibly during a ceremony or inspection. The overall quality is poor, resembling a low-resolution photocopy or a heavily processed photograph.

NONIONIZING RADIATION								
Task #	Type of Nonionizing Radiation	Source Onsite	TLV/PEL	Wavelength Range	Control Measures	Monitoring Instrument		
1	Ultraviolet	DW			SHADE, SUNGLASSES			
	Infrared							
	Radio Frequency							
	Microwave							
	Laser							

— NONIE ANTIC, AFTER

[illegible]

HEALTH AND SAFETY EVALUATION - 4 PHYSICAL HAZARDS OF CONCERN

Phy.Haz.Cond.	Physical Hazard	Alt.OP	Weston OP Titles
Loud noise	Hearing loss/disruption of communication	<input checked="" type="checkbox"/>	FLD01 - Noise Protection
Inclement weather	Rain/humidity/cold/ice/snow/lightning	<input checked="" type="checkbox"/>	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	<input type="checkbox"/>	FLD03 - Hot Process - Steam
Heat/Stress	Burns/hot surfaces/low pressure steam	<input type="checkbox"/>	FLD04 - Hot Process - LTS
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	<input checked="" type="checkbox"/>	FLD05 - Heat Stress Prevention/Monitoring
Cold Stress	Hypothermia/frostbite	<input checked="" type="checkbox"/>	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	<input checked="" type="checkbox"/>	FLD07 - Wet Feet
Confined spaces	Falls/burns/drowning/entanglement/electrocution	<input type="checkbox"/>	FLD08 - Confined Space Entry
Explosive vapors	Thermal burns/impaction/dismemberment	<input type="checkbox"/>	FLD09 - Hot Work
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	<input checked="" type="checkbox"/>	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven Surfaces	Vehicle accidents/slips/trips/falls	<input checked="" type="checkbox"/>	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	<input checked="" type="checkbox"/>	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	<input checked="" type="checkbox"/>	FLD13 - Structural Integrity
Hostile persons	Bodily injury	<input checked="" type="checkbox"/>	FLD14 - Site Security
Remote Area	Slips/trips/falls/back strain/communication	<input checked="" type="checkbox"/>	FLD15 - Remote Area
Improper Cyl.Handling	Mechanical injury/fire/explosion/suffocation	<input type="checkbox"/>	FLD16 - Pressure Systems - Compressed Gases
Water Hazards	Poor visibility/entanglement/drowning/cold stress	<input type="checkbox"/>	FLD17 - Diving
Water Hazards	Drowning/heat/cold stress/hypothermia/falls	<input type="checkbox"/>	FLD18 - Operation and Use of Boats
Water Hazards	Drowning/frostbite/hypothermia/falls/electrocution	<input type="checkbox"/>	FLD19 - Working Over Water
Vehicle Hazards	Struck by vehicle/collision	<input checked="" type="checkbox"/>	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	<input type="checkbox"/>	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards	<input checked="" type="checkbox"/>	FLD22 - Heavy Equipment Operation
Moving mech.parts	Overhead hazard/electrocution	<input checked="" type="checkbox"/>	FLD23 - Cranes/Lifting Equipment Operation
Working at elevation	Overhead hazards/falls/electrocution	<input checked="" type="checkbox"/>	FLD24 - Aerial Lifts/Menlifts
Working at elevation	Overhead hazard/falls/electrocution	<input checked="" type="checkbox"/>	FLD25 - Working at Elevation
Working at elevation	Overhead hazard/falls/electrocution/slips	<input type="checkbox"/>	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	<input type="checkbox"/>	FLD27 - Scaffolding
Trench Cave-in	Crushing/falling/overhead hazards/suffocation	<input checked="" type="checkbox"/>	FLD28 - Excavating/Trenching
Improper material handling	Back injury/crushing from load shifts	<input checked="" type="checkbox"/>	FLD29 - Materials Handling
Pyrochemical	Explosions/fires from oxidizing, flamm./corr.material	<input checked="" type="checkbox"/>	FLD30 - Hazardous Materials Use/Storage
Pyrochemical	Fire and explosion	<input checked="" type="checkbox"/>	FLD31 - Fire Prevention/Response Plan Required
Pyrochemical	Fire	<input checked="" type="checkbox"/>	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	<input checked="" type="checkbox"/>	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	<input checked="" type="checkbox"/>	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	<input type="checkbox"/>	FLD35 - Electrical Safety
Burns/Fires	Heat Stress/Fires/Burns	<input checked="" type="checkbox"/>	FLD36 - Welding/Cutting/Burning
Impact/thermal	Thermal burn/high pressure impaction/heat stress	<input checked="" type="checkbox"/>	FLD37 - High Pressure Washers
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	<input checked="" type="checkbox"/>	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	<input checked="" type="checkbox"/>	FLD39 - Illumination
Fire/Explosion	Burns/impaction	<input checked="" type="checkbox"/>	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of Communications	<input checked="" type="checkbox"/>	FLD41 - Std. Hand/Emergency Signals
Energy/Release	Unexpected release of energy	<input checked="" type="checkbox"/>	FLD42 - Lockout/Tagout
Drilling hazards	Electrocution/overhead hazards/pinch points	<input checked="" type="checkbox"/>	2.5 - Drilling Safety Guide

TASK-BY-TASK RISK ASSESSMENT

Complete One Sheet for Each Task

TASK DESCRIPTION

TASK 1: INSTALLATION OF CHAIN LINK FENCE AROUND SITE PERIMETER AND EXISTING BUILDINGS

EQUIPMENT REQUIRED/USED

(See Appendix, e.g., hand tools, heavy equipment, instruments, PPE)

NOISE BARRIER EQUIP; FENCE STRECHER, ETC; LAUNCH A PPE, INCLUDING HARD HAT, SAFETY GLASSES, STEEL-TOED BOOTS

POTENTIAL HAZARDS/RISKS

CHEMICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? UNKNOWN QUANTITIES AND TYPES LOCATED ON-SITE. HOWEVER, FENCE INSTALLATION WILL BE PERFORMED AROUND BLOBS AND NOT IN DIRECT CONTACT WITH SUSPECT MATERIALS.

PHYSICAL

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What Justifies Risk Level? DEMOLITION OF FACILITY THAT WAS NOT COMPLETED HAS LEFT MANY HAZARDS IN AREA OF SITE. HOWEVER, FENCE INSTALLATION WILL BE PERFORMED AWAY FROM THE REMAINING BLOBS REDUCING THE LEVEL OF RISK.

BIOLOGICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? THERE IS A SMALL RISK OF EXPOSURE TO INSECTS, PRAIRIE DOGS, PLANTS THROUGH EXTERNAL CONTACT. SNAKES AND REPTILES ARE NOT LIKELY TO BE PRESENT. OTHER SMALL ANIMALS MAY PRESENT A HAZARD. CARE SHOULD BE TAKEN TO AVOID THE SIGNS OF FOULS. SEE FLD 43.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L

What Justifies Risk Level? No Hazard expected

CONTROL PROTECTION/REDUCTION

PPE: LEVEL D LEVEL OF RISK IS LOW FOR TASK-INSTALLATION OF A FENCE FOR SECURITY. CONTACT W/ SITE HAZARDS WILL BE AVOIDED.

FLD NO. REQUIRED AND/OR FIELD NO. USED

FLD 01, 02, 06, 07, 10, 12, 13, 14, 20, 22, 23, 24, 28, 29, 30, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42; 2.5 Drilling Safety Guide, 05, 11, 15, 31, 43, 44, 45

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

TASK 2 - REMOVAL OF CONSTRUCTION AND DEMOLITION DEBRIS FROM SITE; MOVEMENT OF EQUIPMENT ON SITE USING HEAVY EQUIPMENT (ABANDONED TRANSFORMERS, ETC)

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

HEAVY EQUIPMENT; LEVEL A PPE; HAND AND POWER TOOLS; MINIRAM FOR PARTICULATES (NUISANCE DUST LEVELS)

POTENTIAL HAZARDS/RISKS

CHEMICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? REMOVAL OF DEBRIS DOES NOT ADD RISK OF DISTURBING CHEMICALS THAT ARE PRESENT ON SITE. IF CONTAINERS ARE UNCOVERED THEY WILL BE HANDLED AS HAZARDOUS

PHYSICAL

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What Justifies Risk Level? CONSTRUCTION - TYPE ACTIVITIES - RISK OF ENCOUNTERS WITH HEAVY EQUIPMENT; WORKING @ ELEVATION; STRUCTURAL INTEGRITY ISSUES

BIOLOGICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? SMALL RISK OF EXPOSURE TO INSECTS AND ANIMALS THROUGHOUT SITE, CARE SHOULD BE TAKEN TO NOTICE SIGNS OF RABIES IN ANIMALS, SEE OF FLA 43

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L NONE ANTICIPATED

What Justifies Risk Level?

LEVELS OF PROTECTION/JUSTIFICATION

PPE: LEVEL A - LEVEL OF RISK IS LOW FOR EXPOSURES - MINIRAM WILL BE USED TO MONITOR DUST LEVELS

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

FLD 01, 02, 05, 06, 07, 10, 12, 13, 14, 15, 20, 22, 23, 24, 25, 29, 30, 31, 32, 33, 34, 36, 38, 39, 41, 42

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

TASK 3 - ASBESTOS INSPECTION AND REMOVAL

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

LEVEL A PPE (N/ 1/2 FACE IFA) FOR INSPECTIONS OF BUILDINGS.
LEVEL C PPE FOR REMOVAL IN ACCORDANCE WITH STANDARD
INDUSTRY PRACTICES; HAND AND POWER TOOLS

POTENTIAL HAZARDS/RISKS

CHEMICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? ASPIRATORS WILL BE WORN FOR BOTH INSPECTIONS
AND ABATEMENT.

PHYSICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? PHYSICAL HAZARDS ASSOCIATED WITH ABATEMENT
(WORKING INSIDE CONTAINMENT, ETC.); INTEGRITY OF
STRUCTURES WILL BE APPRAISED PRIOR TO ENTRY OF BUILDINGS

BIOLOGICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? EXPOSURE RISK TO ANIMALS IN BUILDINGS AND
POSSIBLY INSECTS - BUILDINGS WILL BE INSPECTED AND
PRECAUTIONS WILL BE TAKEN PER OF FLD43

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L NONE ANTICIPATED

What Justifies Risk Level?

LEVELS OF PROTECTION/JUSTIFICATION

- LEVEL D AND LEVEL C PROTOCOLS BASED ON STANDARD
INDUSTRY PRACTICES FOR ASBESTOS HAZARDS
- CONTRACTOR WILL BE RESPONSIBLE FOR AIR SAMPLING IN
ACCORDANCE WITH OSHA REGULATIONS FOR ABATEMENT

SAFETY PROCEDURES REQUIRED AND/OR FIELD USE UTILIZATION

FLD 01, 02, 05, 06, 07, 10, 11, 12, 13, 14, 15, 29, 31, 32, 33, 34,
36, 37, 39, 41, 42

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

TASK 4 - PCB REMOVAL - DRAIN/PUMP OUT PCB EQUIP/DRUM LIQUIDS; CLEAN OR SHIP OFFSITE TO BE CLEANED, AND DISPOSED OF PROPERLY PER REGULATIONS

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

LEVEL A PPE; HANDS AND POWER TOOLS; PUMPS AND TANKS FOR LIQUIDS REMOVED FROM TRANSFORMERS AND CAPACITORS, POSSIBLY IN DRUMS, ALSO; HEAVY EQUIPMENT; PID INSTR.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? PCB LIQUIDS WILL BE CONTAINED AND TRANSFERRED USING PUMPS AND DRAIN LINES. MINIMAL CONTACT WITH CONTAMINATED PARTS IS NECESSARY.

PHYSICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? ONCE DRUMS AND EQUIP. ARE STAGED, PHYSICAL RISK IS LOW FOR TRANSFER OF LIQUIDS AND PREPARATION FOR DISPOSAL. DRUMS ARE CONSIDERED HAZARDOUS UNTIL INSPECTED PROPERLY.

BIOLOGICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? RISK IS LOW FOR ENCOUNTERS WITH INSECTS AND ANIMALS ON SITE. CARE SHOULD BE TAKEN TO NOTICE SIGNS OF RABIES IN ANIMALS. SEE DA FLD 43

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L NONE ANTICIPATED

What Justifies Risk Level?

LEVELS OF PROTECTION/JUSTIFICATION

PPE: LEVEL A - LEVEL OF RISK IS LOW FOR EXPOSURES - PID WILL BE USED TO MONITOR FOR VOLATILE ORGANICS PRESENT

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

FLD 01, 02, 05, 06, 07, 10, 11, 12, 13, 14, 15, 20, 22, 23, 29, 30, 31, 32, 36, 37, 38, 39, 41

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

TASK 5 - REMOVAL OF UST CONTENTS (SAMPLING OF CONTENTS FOR DISPOSAL; PUMP OR VACUUM OUT CONTENTS; TRANSPORT OFF-SITE)

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

LEVEL D PPE; PID INSTRUMENT; PUMP OR VACUUM TRUCK; HAND AND POWER TOOLS

POTENTIAL HAZARDS/RISKS

CHEMICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? FUEL OIL (AS KEROSENE) IS ANTICIPATED HAZARD - PID WILL BE USED TO MONITOR LEVELS IN BREATHING ZONE (TO MONITOR FOR OTHER POTENTIAL CHEMICALS)

PHYSICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? CONSTRUCTION-TYPE ACTIVITIES - RISK OF ENCOUNTERS WITH HEAVY EQUIPMENT; WORKING WITH FLAMMABLE LIQUIDS IN BULK CONTAINERS. DRUMS ARE

CONSIDERED HAZARDOUS UNTIL INSPECTED PROPERLY.

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What Justifies Risk Level? SMALL RISK OF EXPOSURE TO INSECTS AND ANIMALS THROUGHOUT SITE. CARE SHOULD BE TAKEN TO NOTICE SIGNS OF RABIES IN ANIMALS, SEE OP FLD 43

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L NONE ANTICIPATED

What Justifies Risk Level?

LEVELS OF PROTECTION/JUSTIFICATION

PPE: LEVEL D - LEVEL OF RISK IS LOW FOR EXPOSURES - PID WILL BE USED TO MONITOR FOR POTENTIAL VOLATILE ORGANICS IN THE BREATHING ZONE.

SAFETY PROCEDURES REQUIRED AND/OR FIELD USE/CONTROL MEASURES

FLD 01, 02, 05, 06, 07, 10, 11, 12, 14, 15, 20, 22, 28, 29, 30, 31, 32, 34, 38, 39, 41, 42

PERSONNEL PROTECTION PLAN

Engineering Controls

Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s) #2 - INITIATE AUST SUPPRESSION AS NECESSARY

Administrative Controls

Describe Administrative controls used as part of Personnel Protection Plan:

Task(s) ALL - WORKERS WILL STAY OUT OF DANGER AND NOT DISTURB STORES PRES. UNLESS AUTHORIZED BY SHSC OR SITE MANAGER

Personal Protective Equipment

Action Levels for Changing Levels of Protection. Define Action Levels for up or down grade for each task:

Task(s) ALL - IF AT ANY TIME AN UNKNOWN SUBSTANCE IS ENCOUNTERED, STOP WORK AND CONSULT WITH SHSC (CONTAINERS, GAS CYLINDERS, ETC.) CONSULT RSO AS NECESSARY.

#2 - MINIRAM ACTION LEVEL $> 5 \text{ mg/m}^3$ - STOP WORK AND INITIATE AUST SUPPRESSION, CONSULT RSO AND SHSC.

#5 - PID > 1 UNIT IN BREATHING ZONE - STOP WORK AND CONSULT SHSC + RSO

Description of Levels of Protection

Level D	Level D (MODIFIED)
<p>Task(s): ALL</p> <p><input checked="" type="checkbox"/> Head Hard hat</p> <p><input checked="" type="checkbox"/> Eye and Face safety Glasses</p> <p><input checked="" type="checkbox"/> Hearing earplugs as necessary</p> <p><input type="checkbox"/> Arms and Legs Only</p> <p><input checked="" type="checkbox"/> Appropriate Work Uniform</p> <p><input checked="" type="checkbox"/> Hand - Gloves latex, nitrile, cotton, leather as necessary</p> <p><input checked="" type="checkbox"/> Foot - Safety Boots Safety toed</p> <p><input checked="" type="checkbox"/> Fall Protection AS necessary</p> <p><input type="checkbox"/> Flotation</p> <p><input type="checkbox"/> Other</p>	<p>Task(s):</p> <p><input type="checkbox"/> Head</p> <p><input type="checkbox"/> Eye and Face</p> <p><input type="checkbox"/> Hearing</p> <p><input type="checkbox"/> Arms and Legs Only</p> <p><input type="checkbox"/> Whole Body</p> <p><input type="checkbox"/> Apron</p> <p><input type="checkbox"/> Hand - Gloves</p> <p><input type="checkbox"/> Gloves</p> <p><input type="checkbox"/> Gloves</p> <p><input type="checkbox"/> Foot - Safety Boots</p> <p><input type="checkbox"/> Boots</p> <p><input type="checkbox"/> Boots</p>

Description of Levels of Protection	
Level C (FUR ASBESTOS)	Level B
Task(s): 3 (ASBESTOS TILES)	Task(s):
<input type="checkbox"/> Head	<input type="checkbox"/> Head
<input type="checkbox"/> Eye and Face	<input type="checkbox"/> Eye and Face
<input type="checkbox"/> Hearing	<input type="checkbox"/> Hearing
<input type="checkbox"/> Arms and Legs Only	<input type="checkbox"/> Arms and Legs Only
<input checked="" type="checkbox"/> Whole Body TYVEK	<input type="checkbox"/> Whole Body
<input type="checkbox"/> Apron	<input type="checkbox"/> Apron
<input checked="" type="checkbox"/> Hand - Gloves	<input type="checkbox"/> Hand - Gloves
<input checked="" type="checkbox"/> Gloves LATEX OR NITRILE	<input type="checkbox"/> Gloves
<input type="checkbox"/> Gloves	<input type="checkbox"/> Gloves
<input checked="" type="checkbox"/> Foot - Boots	<input type="checkbox"/> Foot - Boots
<input checked="" type="checkbox"/> Boots STEEL-TOE	<input type="checkbox"/> Boots
<input type="checkbox"/> Boots	<input type="checkbox"/> Boots
<input checked="" type="checkbox"/> Half Face MSA 1/2 FACE OR SIMILAR	<input type="checkbox"/> SAR - Airline
<input checked="" type="checkbox"/> Can/Canister MSA HEPA OR GMC-H OR SIMILAR	<input type="checkbox"/> SCBA
<input checked="" type="checkbox"/> Full Face MSA ULTRATWIN OR SIMILAR	<input type="checkbox"/> Comb. Airline/SCBA
<input checked="" type="checkbox"/> Can/Canister MSA HEPA OR GMC-H OR SIMILAR	<input type="checkbox"/> Cascade System
<input checked="" type="checkbox"/> PAPER (SUB CONTRACTOR - SPECIFIC)	<input type="checkbox"/> Compressor
<input checked="" type="checkbox"/> Can/Canister	<input type="checkbox"/> Fall Protection
<input type="checkbox"/> Type C	<input type="checkbox"/> Flotation
<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Other
<input type="checkbox"/> Flotation	
<input type="checkbox"/> Other	

SITE OR PROJECT HAZARD MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Instrument Selection and Initial Check Record

Reporting Format: ☒ Field Notebook ☐ Field Data Sheets ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
<input type="checkbox"/> CGI				<input type="checkbox"/>		
<input type="checkbox"/> O ₂				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O ₂				<input type="checkbox"/>		
<input type="checkbox"/> CGI/O ₂ /tox-PPM, H ₂ S, H ₂ S/CO				<input type="checkbox"/>		
<input type="checkbox"/> RAD-GM				<input type="checkbox"/>		
<input type="checkbox"/> NaI				<input type="checkbox"/>		
<input type="checkbox"/> ZnS				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input checked="" type="checkbox"/> PID	# 4+5	1		<input type="checkbox"/>		
<input type="checkbox"/> HNU 10.2				<input type="checkbox"/>		
<input type="checkbox"/> HNU 11.7				<input type="checkbox"/>		
<input type="checkbox"/> Photovac, TMA				<input type="checkbox"/>		
<input checked="" type="checkbox"/> CVM (any size TMA 100)	# 4+5	1		<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input type="checkbox"/> FID				<input type="checkbox"/>		
<input type="checkbox"/> FOX 128				<input type="checkbox"/>		
<input type="checkbox"/> Heath, AID, Other _____				<input type="checkbox"/>		
<input checked="" type="checkbox"/> RAM, Mini-RAM, Other _____	# 2	1		<input type="checkbox"/>		
<input type="checkbox"/> Monotox				<input type="checkbox"/>		
<input type="checkbox"/> H ₂ S				<input type="checkbox"/>		
<input type="checkbox"/> COCL				<input type="checkbox"/>		
<input type="checkbox"/> SO ₂				<input type="checkbox"/>		
<input type="checkbox"/> HCN				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		
<input type="checkbox"/> Bio-Aerosol Monitor				<input type="checkbox"/>		
<input type="checkbox"/> Detector Tubes				<input type="checkbox"/>		
<input type="checkbox"/> Pump - MSA, Dräger, Sensidyne				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Tubes/type: _____				<input type="checkbox"/>		
<input type="checkbox"/> Other _____				<input type="checkbox"/>		

[illegible]

SITE AIR MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

→ Air Monitoring Instrument:

PID

Air Monitoring Frequency:

☒ Periodically: READINGS SHOULD BE TAKEN ONCE EVERY 1/2 HOUR DOWN WIND OF TASKS

☐ Periodically: ACTIVITIES.

☐ Continuously:

☐ Other:

48.5.

0.04

Monitoring Locations

☒ Upwind/downwind of site activities

☐ Near residents, etc.

☒ Key site activity locations:

☐ Decon area

☒ Staging area

☒ Excavation area

☐ Field lab area

☐ Storage tanks

☐ Lagoons

☒ Drums

☐ Fixed stations

☒ Other: IN BREATHING ZONES OF WORKERS

→ Air Monitoring Instrument: MINIRAM

Air Monitoring Frequency:

☒ Periodically: EVERY HOUR AND DURING DUST GENERATING

☐ Periodically: ACTIVITIES

☐ Continuously:

☐ Other:

Monitoring Locations

☒ Upwind/downwind of site activities

☐ Near residents, etc.

☒ Key site activity locations: (4) ACTIVITY LOCATION

☐ Decon area

☐ Staging area

☐ Excavation area

☐ Field lab area

☐ Storage tanks

☐ Lagoons

☐ Drums

☐ Fixed stations

☒ Other: IN BREATHING ZONES OF WORKERS

SITE AIR MONITORING PROGRAM

Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/REL/TLV. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level		Action
<input type="checkbox"/> Explosive atmosphere		Ambient Air Concentration	Confined Space Concentration	
		< 10% LEL	0 to 1% LEL	Work may continue. Consider toxicity potential.
		10 to 25% LEL	1 to 10% LEL	Work may continue. Increase monitoring frequency.
		> 25% LEL	> 10% LEL	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Oxygen		Ambient Air Concentration	Confined Space Concentration	
		< 19.5% O ₂	< 19.5% O ₂	Leave Area. Re-enter only with self-contained breathing apparatus.
		19.5% to 25% O ₂	19.5% to 23.5% O ₂	Work may continue. Investigate changes from 21%.
		> 25% O ₂	> 23.5% O ₂	Work must stop. Ventilate area before returning.
<input type="checkbox"/> Radiation		<p>< 3 times background</p> <p>3 Times Background to < 1 mR/hour</p> <p>> 1 mrem/hour</p>		<p>Continue Work</p> <p>Radiation above background levels (normally 0.01-0.02 mR/hr) signifies possible source(s) radiation present. Continue investigation with caution. Perform thorough monitoring. Consult with a Health Physicist.</p> <p>Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of Health Physicist.</p>
<input checked="" type="checkbox"/> Organic gases and vapors	1	<p>3 / ppm ABOVE BKGD</p> <p>IN BREATHING ZONE</p>		<p>stop work & CONSULT PEO</p>
<input checked="" type="checkbox"/> Inorganic gases, vapors and particulates	1	<p>> 5 mg/m³</p>		<p>stop work & CONSULT SHSC; USE DUST SUPPRESSION</p>

SITE AIR MONITORING PROGRAM

Ambient Air Sampling

Check situations which will require or action levels which will apply to deciding to institute or increase scope of planned air sampling.

☐ No air sampling is required on this site.

☒ An air sampling plan is incorporated in this HASP.

Meteorological Conditions

☐ Dry weather for ____ days

☐ Ambient temperature above ____ °F

☐ Wind increasing potential of more contaminant dispersion in or migration out of controlled area.

Activities which will require instituting or increasing scope of air sampling:

☐ Major spills

☐ New site activity resulting in potential presence of new chemical hazards.

☐ Site activity increases airborne contaminants possibilities.

☒ Air sampling documentation required for:

☐ Downgrading from stipulated level of protection

☒ Documenting no migration of contaminants offsite through air

Applicable Action Levels for Instituting Air Sampling: N/A

☐ Visible vapor/gas clouds or vapor levels, or

☐ Visible dust or particulate levels measured with Direct Reading Instrument, two-three times background or above action level, sustained over 10-15 minute period.

The following requirements apply to air sampling:

Sampling Matrix/Air Interface - Monitor matrix/air interface and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor continuously. Follow No. 4.

Container Opening - Monitor opening and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Excavation/Drilling/Intrusive Work - Monitor at ground level and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Breathing Zone - Ensure level of protection specified in HASP is being used. Consult HASP or Corporate Health and Safety relative to instituting personnel, area, or perimeter sampling.

☒ Other

Asbestos abatement and oversight contractors will provide air sampling plans for OSHA personal air monitoring and area sampling.

CONTINGENCIES

Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility (LMF)	St Elizabeth Medical Center	(937) 229-6387
WESTON Medical Emergency Contact	EMR - Dr. Elayne Therault	1-800-229-3674
WESTON Health and Safety	Corporate Health and Safety	(610) 701-7406 or (610) 701-3000
Fire Department	Dispatcher	911
Police Department	Sgt. Dana Tackett	911 or (937) 449-1290
Onsite Coordinator	TBD	(513) 659-9475
Site Telephone	TBD	TBD
Nearest Telephone	TBD	TBD

Local Medical Emergency Facility(s)

Name of Hospital: St. Elizabeth Medical Center		
Address: 601 S. Edwin C. Moses Blvd. Dayton, OH		Phone No.: (937) 229-6387
Name of Contact:		Phone No.:
Type of Service: <input type="checkbox"/> Physical trauma only <input type="checkbox"/> Chemical exposure only <input checked="" type="checkbox"/> Physical trauma and chemical exposure <input checked="" type="checkbox"/> Available 24 hours	Route to Hospital (written detail): Turn right onto Webster from Detrich. Turn right onto Herbert - take ramp to Rt. 4 west. Follow I-75 south. Exit at Albany Street - turn left (east). Turn left at Cincinnati Street. Follow signs to emergency entrance.	Travel time from site: <u>10 - 12 min</u> Distance to hospital: <u>8 - 10 mi</u> Name/No. of 24-hr Ambulance Service: Local 911

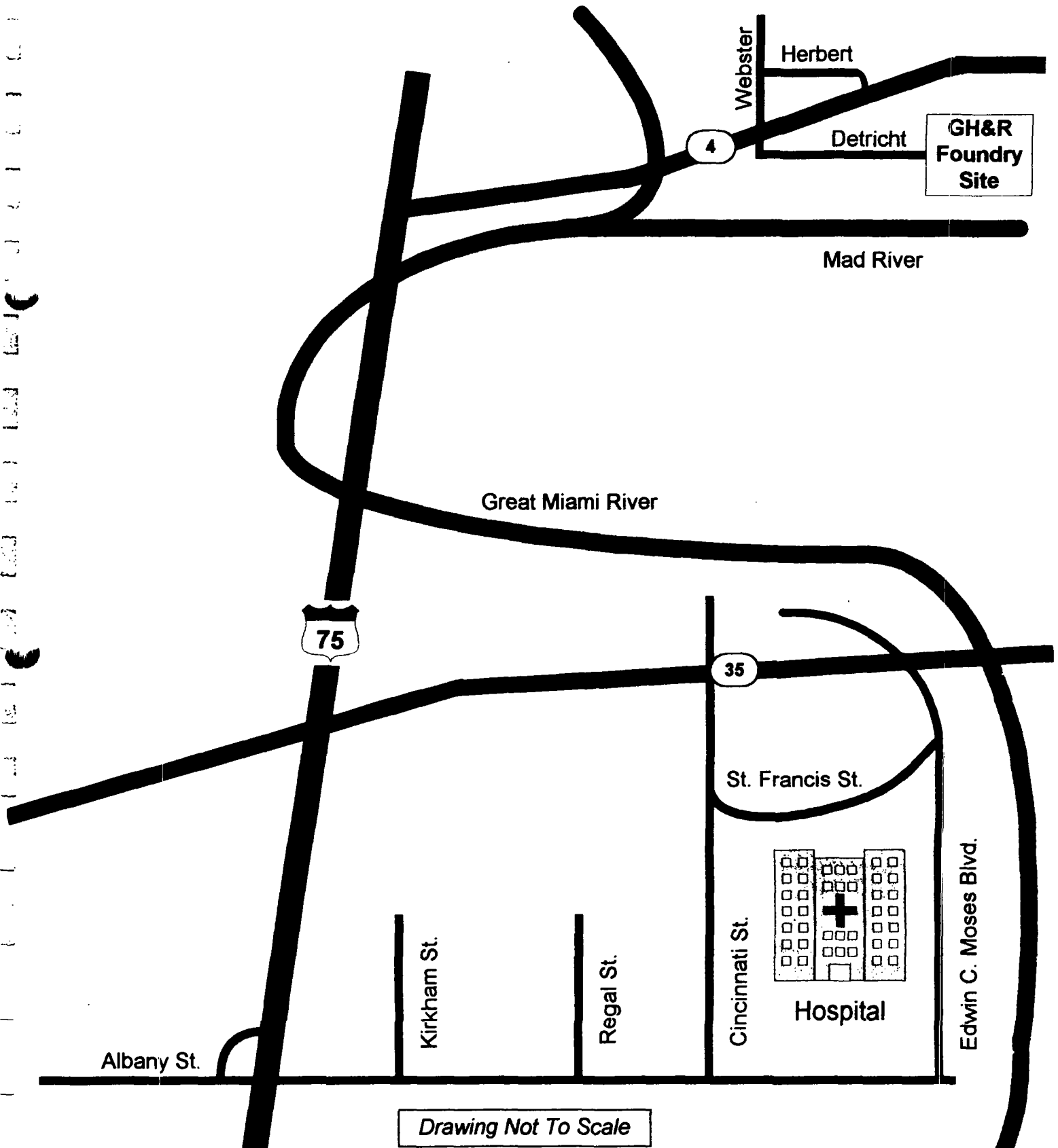
Secondary or Specialty Service Provider

Name of Hospital: Grandview Hospital		
Address: 485 Grand Avenue Dayton, OH		Phone No.: (937) 226-3200
Name of Contact:		Phone No.: (937) 226-3681
Type of Service: <input checked="" type="checkbox"/> Physical trauma only <input type="checkbox"/> Chemical exposure only <input type="checkbox"/> Physical trauma and chemical exposure <input checked="" type="checkbox"/> Available 24 hours	Route to Hospital (written detail): Turn right onto Webster from Detrich. Turn right onto Herbert - take ramp to Rt. 4 west. Follow I-75 south. Exit at Grand Avenue - turn right (west). Turn right at hospital. Follow signs to emergency entrance.	Travel time from site: <u>5 - 7 min</u> Distance to hospital: <u>2 - 3 mi</u> Name/No. of 24-hr Ambulance Service: Local 911

Figure 1 Route to Hospital
(Draw map to hospital here if space permits or attach on next sheet.)

See maps on next pages.

St. Elizabeth Medical Center
601 S. Edwin C. Moses Blvd.
Dayton, OH
937-229-6387



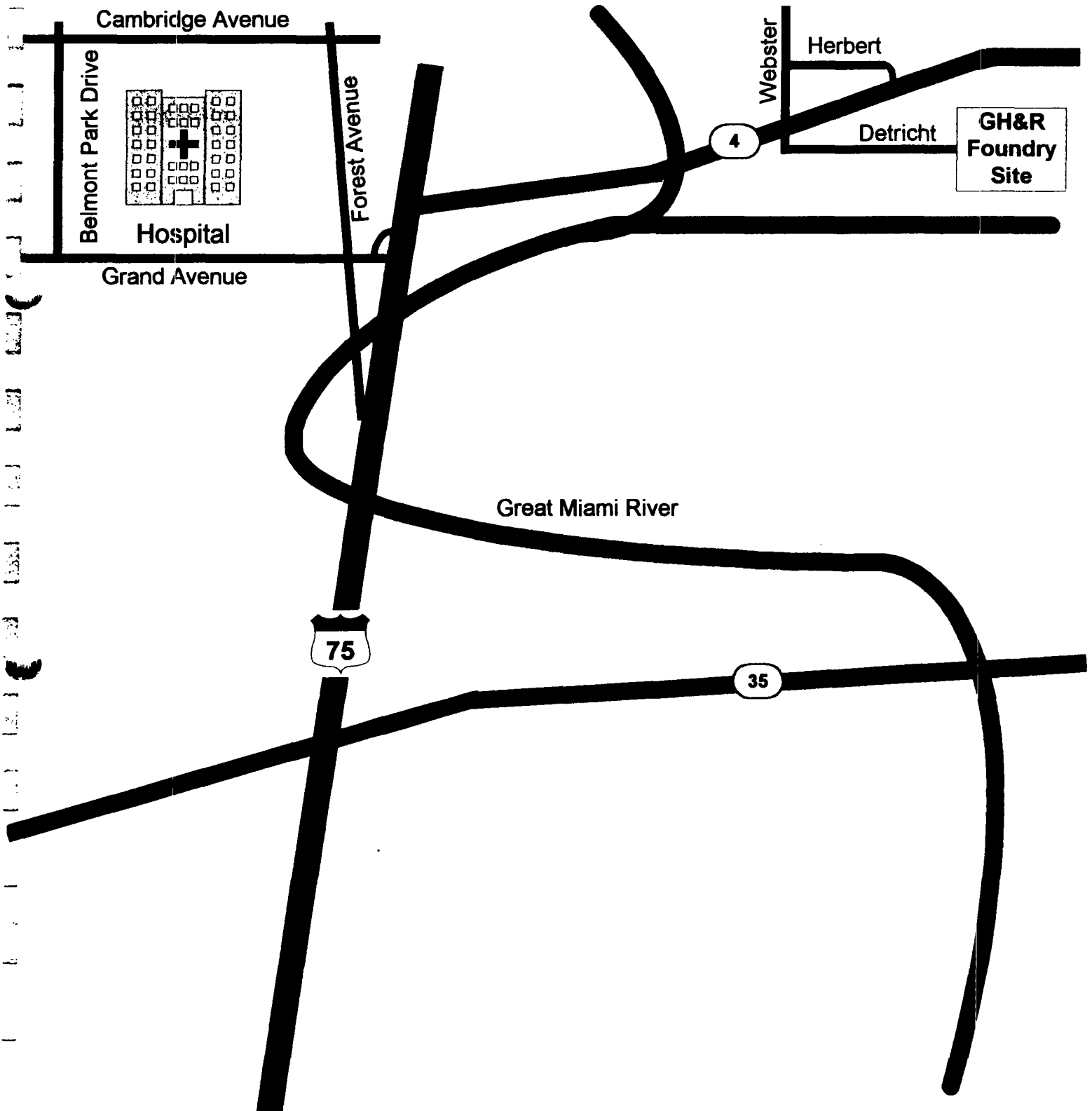
Drawing Not To Scale

Grandview Hospital

405 Grand Avenue

Dayton, OH

937-226-3200



Drawing Not To Scale

CONTINGENCIES

Response Plans

Medical - General

Provide First Aid as trained, assess and determine need for further medical assistance, Transport or arrange for transport after appropriate decontamination

First Aid Kit:

Type
1st Responder
w/BBP
Kit

Location
Field
Vehicle

Special First Aid Procedures:
Cyanides on site
☐ Yes ☒ No
If yes, contact LMF. Do they have antidote kit?
☐ Yes ☒ No

Eyewash required

☒ Yes ☐ No

Type
15 MIN.
Eyewash
STATION

Location
Field
Vehicle

HF on site
☐ Yes ☒ No
If yes, need neutralizing ointment for First Aid kit. Contact LMF.

Shower required

☐ Yes ☒ No

Type

Location

Plan for Response to Spill/Release

In the event of a spill or release, ensure safety, assess situation and perform containment and control measures as appropriate:

- Clean up per MSDS if small or; Sound Alarm, call for assistance, Notify Emergency Coordinator
- Evacuate to pre-determined safe place
- Account for personnel
- Determine if Team can respond safely
- Mobilize per Site Spill Response Plan

Plan for Response to Fire/Explosion

In the event of a fire or explosion, ensure personal safety, assess situation and perform containment and control measures as appropriate:

- Sound Alarm and call assistance, Notify Emergency Coordinator
- Evacuate to predetermined safe place
- Account for personnel
- Use fire extinguisher, only if safe and trained
- Standby to inform Emergency responders of materials and conditions

Fire Extinguishers

Type/Location

BC
20:10
IN VEHICLE
OR OTHER
LOCATION
NEAR
ACTIVITY

Description of Spill Response Gear

NONE

Location

N/A

Description (Other Fire Response Equipment)

NONE

Location

N/A

Plan to Response to Security Problems

CALL 911

DECONTAMINATION PLAN

Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each Level of Protection are attached.

Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B

☐ Level C

☒ Level D

Modifications include: *LITEL GUNES.*

Disposition of Decontamination Wastes

Provide a description of waste disposition including identification of storage area, hauler, and final disposal site, if applicable:

*BAGGED AND MAINTAINED ON SITE. LABELED AS DECON WASTE.
MUST BE STORED INSIDE A SECURE AREA. FINAL DISPOSAL SITE
YET TO BE DETERMINED.*

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows:

N/A @ THIS TIME

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:

N/A @ THIS TIME (WILL USE DISPOSABLE SAMPLING EQUIPMENT)

N/A = NOT APPLICABLE

LEVEL D/MODIFIED LEVEL D DECONTAMINATION PLAN

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
<input type="checkbox"/> Segregated equipment drop	
<input type="checkbox"/> Boot cover and glove wash	
<input type="checkbox"/> Boot cover and glove rinse	
<input type="checkbox"/> Tape removal - outer glove and boot	
<input type="checkbox"/> Boot cover removal	
<input checked="" type="checkbox"/> Outer glove removal	
HOTLINE	
<input type="checkbox"/> Suit/safety boot wash	REMOVE AND DISPOSE IN CONTAINER
<input type="checkbox"/> Suit/boot/glove rinse	
<input type="checkbox"/> Safety boot removal	
<input type="checkbox"/> Suit removal	
<input type="checkbox"/> Inner glove wash	
<input type="checkbox"/> Inner glove rinse	
<input type="checkbox"/> Inner glove removal	
<input type="checkbox"/> Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
<input checked="" type="checkbox"/> Field wash	HANDS & FACE PRIOR TO LEAVING SITE
<input type="checkbox"/> Redress	

Disposal Plan, End of Day:

BAG AND LABEL. STORE IN A SECURE AREA. DISPOSAL LOCATION (FINAL) YET TO BE DETERMINED.

Disposal Plan, End of Week:

SEE ABOVE

Disposal Plan, End of Project:

SEE ABOVE

LEVEL C DECONTAMINATION PLAN (PER CONTRACTOR'S)

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
<input type="checkbox"/> Segregated equipment drop	
<input type="checkbox"/> Boot cover and glove wash	
<input type="checkbox"/> Boot cover and glove rinse	
<input type="checkbox"/> Tape removal - outer glove and boot	
<input type="checkbox"/> Boot cover removal	
<input type="checkbox"/> Outer glove removal	
	→ OP FOR ASBESTOS ABATEMENT IN ACCORDANCE W/ OSHA REGULATIONS
	HOTLINE
<input type="checkbox"/> Suit/safety boot wash	
<input type="checkbox"/> Suit/boot/glove rinse	
<input type="checkbox"/> Safety boot removal	
<input type="checkbox"/> Suit removal	
<input type="checkbox"/> Inner glove wash	
<input type="checkbox"/> Inner glove rinse	
<input type="checkbox"/> Face piece removal	
<input type="checkbox"/> Inner glove removal	
<input type="checkbox"/> Inner clothing removal	
	CRC/SAFE ZONE BOUNDARY
<input type="checkbox"/> Field wash	
<input type="checkbox"/> Address	

Disposal Plan, End of Day:

PER STATE REGULATIONS
FOR ASBESTOS DISPOSAL

Disposal Plan, End of Work:

SAME AS ABOVE

Disposal Plan, End of Project:

SAME AS ABOVE

SITE PERSONNEL AND CERTIFICATION STATUS

WESTON

Name: Karen Arthur Title: Assoc. Engineer Task(s): / Certification Level or Description: SHSC; D-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Steve Berry Title: Senior Technician Task(s): / Certification Level or Description: SHSC - D-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Kevin Bate Title: / Task(s): / Certification Level or Description: SHSC - B-S <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Julie Schucker, P.G. Title: Senior Project Geologist Task(s): / Certification Level or Description: SHSC - D-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Michael May Title: / Task(s): / Certification Level or Description: SHSC - D-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: Scott Pitner Title: Asst. Geologist Task(s): / Certification Level or Description: C-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: Mike Szabo, P.E. Title: Project Engineer Task(s): / Certification Level or Description: SHSC - D-S, B-T <input checked="" type="checkbox"/> Medical Current <input checked="" type="checkbox"/> Training Current <input checked="" type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: / Title: / Task(s): / Certification Level or Description: / <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: / Title: / Task(s): / Certification Level or Description: / <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: / Title: / Task(s): / Certification Level or Description: / <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)
Name: / Title: / Task(s): / Certification Level or Description: / <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)	Name: / Title: / Task(s): / Certification Level or Description: / <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Qual.) <input type="checkbox"/> Fit Test Current (Quant.)

TRAINING CURRENT - Training: All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910, 29 CFR 1926 or 29 CFR 1910.120.

FIT TEST CURRENT - Respirator Fit Testing: All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI within the last 12 months. If site conditions require the use of a full face negative pressure, air purifying respirator for protection from Asbestos or Lead, employees must have had a quantitative fit test, administered according to OSHA 29 CFR 1910.1001 or 1026 within the last 6 months.

MEDICAL CURRENT - Medical Monitoring Requirements: All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work, and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910 or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: SECURITY FENCE CO.

Address: 4260 DANE AVE., CINCINNATI, OH 45223

Activities to Be Conducted by Subcontractor: TASK #1 - FENCE INSTALLATION

Evaluation Criteria

Medical program meets OSHA/NESTON criteria

- ☐ Acceptable
☐ Unacceptable

Comments:

N/A

Personal protective equipment available

- ☒ Acceptable
☐ Unacceptable

Comments:

Crane monitoring equipment available, calibrated and operated properly

- ☐ Acceptable
☐ Unacceptable

Comments: WESTON PROVIDES

Safe working procedures clearly specified

- ☒ Acceptable
☐ Unacceptable

Comments:

FOR CONSTRUCTION ACTIVITIES

Training meets OSHA/NESTON criteria

- ☒ Acceptable
☐ Unacceptable

Comments:

FOR CONSTRUCTION ACTIVITIES
NO 40-HR REQ

Emergency procedures

- ☒ Acceptable
☐ Unacceptable

Comments:

SUBCONTRACTOR PERSONNEL TO FOLLOW WESTON HASP

Decontamination procedures

- ☒ Acceptable
☐ Unacceptable

Comments:

FOR CONSTRUCTION ACTIVITIES

General health and safety program evaluation

- ☒ Acceptable
☐ Unacceptable

Comments:

FOR CONSTRUCTION ACTIVITIES

Additional comments:

- ☒ Subcontractor has agreed to and will conform with the WESTON HASP for this Project.
☐ Subcontractor will work under his own HASP which has been accepted by Corporate Health and Safety.

Evaluation Conducted by:

Date:

Subcontractor

Name: Tom Kirklin
Title: Crew Leader
Task(s): Fence Installation
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

Name: Darrell Winningham
Title:
Task(s): Fence Installation
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

Name: Jeff Engel
Title:
Task(s): Fence Installation
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

Name:
Title:
Task(s):
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

Name:
Title:
Task(s):
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

Name:
Title:
Task(s):
Certification Level or Description:

- ☐ Medical Current
☐ First Aid Current (Dist.)
☐ Training Current
☐ First Aid Current (Dist.)

* see attached certification cards.

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: THE STAVEL GROUP
 Address: 1271 E. 2ND ST., FRANKLIN, OH 45005 (513) 743-7995

Activities to Be Conducted by Subcontractor: TASK #2 - DEBRIS REMOVAL

Evaluation Criteria

Medical program meets OSHA/WESTON criteria

- ☐ Acceptable
☐ Unacceptable

Comments: N/A

Personal protective equipment available

- ☐ Acceptable
☐ Unacceptable

Comments: N/A

Onsite monitoring equipment available, calibrated and operated properly

- ☒ Acceptable
☐ Unacceptable

Comments: WESTON PROVIDES

Safe working procedures clearly specified

- ☒ Acceptable FOR CONSTRUCTION ACTIVITIES
☐ Unacceptable

Comments:

Training meets OSHA/WESTON criteria

- ☒ Acceptable FOR CONSTRUCTION ACTIVITIES
☐ Unacceptable

Comments: NO 40-HR REQ.

Emergency procedures

- ☒ Acceptable SUBCONTRACTOR PERSONNEL TO FOLLOW WESTON HASP
☐ Unacceptable

Comments:

Decontamination procedures

- ☒ Acceptable FOR CONSTRUCTION ACTIVITIES
☐ Unacceptable

Comments:

General health and safety program evaluation

- ☒ Acceptable FOR CONSTRUCTION ACTIVITIES
☐ Unacceptable

Comments:

Additional comments:

- ☒ Subcontractor has agreed to and will conform with the WESTON HASP for this Project.
☐ Subcontractor will work under his own HASP which has been accepted by Corporate Health and Safety.

Evaluation Conducted by: KAREN ARTHUR

Date: 2-20-97

Subcontractor

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

Name:
 Title:
 Task(s):
 Certification Level or Description:

- ☐ Medical Current ☐ Training Current
☐ Fit Test Current (Quart.) ☐ Fit Test Current (Quart.)

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: TEL
Address:

Activities to Be Conducted by Subcontractor: TASK #3 - ASBESTOS ABATEMENT

Evaluation Criteria

<p>Medical program meets OSHA/WESTON criteria</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Personal protective equipment available</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Onsite monitoring equipment available, calibrated and operated properly</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>
<p>Safe working procedures clearly specified</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Training meets OSHA/WESTON criteria</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Emergency procedures</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>
<p>Decontamination procedures</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>General health and safety program evaluation</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Additional comments:</p> <p><input type="checkbox"/> Subcontractor has agreed to and will conform with the WESTON HASP for this Project.</p> <p><input type="checkbox"/> Subcontractor will work under its own HASP which has been accepted by Corporate Health and Safety.</p>

Evaluation Conducted by:

Date:

Subcontractor

<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>
<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>
<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)</p>

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: TBA
Address:

Activities to Be Conducted by Subcontractor: TASK #4 - PCB REMOVAL

Evaluation Criteria

<p>Medical program meets OSHA/WESTON criteria</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Personal protective equipment available</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Onsite monitoring equipment available, calibrated and operated properly</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>
<p>Safe working procedures clearly specified</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Training meets OSHA/WESTON criteria</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Emergency procedures</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>
<p>Decontamination procedures</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>General health and safety program evaluation</p> <p><input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable</p> <p>Comments:</p>	<p>Additional comments:</p> <p><input type="checkbox"/> Subcontractor has agreed to and will conform with the WESTON HASP for this Project.</p> <p><input type="checkbox"/> Subcontractor will work under his own HASP which has been accepted by Corporate Health and Safety.</p>

Evaluation Conducted by:

Date:

Subcontractor

<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>
<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>
<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>	<p>Name: Title: Task(s): Certification Level or Description:</p> <p><input type="checkbox"/> Medical Current <input type="checkbox"/> Fit Test Current (Qual.)</p> <p><input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quant.)</p>

SITE PERSONNEL AND CERTIFICATION STATUS		
Subcontractor's Health and Safety Program Evaluation		
Name of Subcontractor: TBI Address:		
Activities to Be Conducted by Subcontractor: TASK #5 - LIST CONTENTS REMOVAL		
Evaluation Criteria		
Medical program meets OSHA/WESTON criteria <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	Personal protective equipment available <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	Onsite monitoring equipment available, calibrated and operated properly <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:
Safe working procedures clearly specified <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	Training meets OSHA/WESTON criteria <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	Emergency procedures <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:
Decontamination procedures <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	General health and safety program evaluation <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments:	Additional comments: <input type="checkbox"/> Subcontractor has agreed to and will conform with the WESTON HASP for this Project. <input type="checkbox"/> Subcontractor will work under his own HASP which has been accepted by Corporate Health and Safety.
Evaluation Conducted by:		Date:
Subcontractor		
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	
Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	Name: Title: Task(s): Certification Level or Description: <input type="checkbox"/> Medical Current <input type="checkbox"/> Training Current <input type="checkbox"/> Fit Test Current (Quart.) <input type="checkbox"/> Fit Test Current (Quart.)	

HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM

Site Name: GHR Foundry WO# 11688-001-001-0100-00

Address: 400 Derrick St Dayton OH

I understand, agree to and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing(s).

WO# 11688-001-001-0100-00

I understand, agree to and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing(s).

Durbo[illegible]

ATTACHMENT 'A'

CHEMICAL CONTAMINANTS

DATA SHEETS

**(Use HASP Form 33HASP.894
or attach appropriate data sheets.)**

HEALTH AND SAFETY EVALUATION — □ CHEMICAL HAZARDS

Hazardous Substance/Task	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
COAL TAR PITCH VOLATILES	<input type="checkbox"/> Explosive <input checked="" type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: <u>VARIABLE</u> FP: <u></u> LEL: <u></u> UEL: <u></u> Auto. Ig.: <u></u> BP: <u></u> MP: <u></u> Sp. Gr.: <u></u> Vap. D.: <u></u> Vap. P.: <u></u> H ₂ O Sol.: <u>↓</u> Other: <u></u>	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> PEL <u>0.2 mg/m³</u> <input type="checkbox"/> TLV <u></u> <input checked="" type="checkbox"/> IDLH <u>80 mg/m³</u> <input type="checkbox"/> Only toxicological data available <input checked="" type="checkbox"/> Other: <u>Carcinogen</u> <u>NIOSH REL 0.1 mg/m³</u>	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other: <u></u> Symptoms: <u>DERM, BRONCH</u>	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> CGI <input type="checkbox"/> OVA <input type="checkbox"/> <u></u> IF: <u>?</u> % Response: <u>N/A</u>
CAS No: 65996-93-2		Incompatible With: <u>STRONG OXIDIZERS</u>					
Synonyms: COAL TAR, CREOSOTE							

HEALTH AND SAFETY EVALUATION - CHEMICAL HAZARD							
Hazardous Substance/Tanks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/ Ionization Potential + % Response
KEROSENE	<input type="checkbox"/> Explosive <input checked="" type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: <u>N/A</u> FP: <u>100° - 162°F</u> LEL: <u>0.7%</u> UEL: <u>5%</u> Auto. Ig: <u>N/A</u> BP: <u>347° - 617°F</u> MP: <u>-50°F</u> Sp. Gr.: <u>0.81</u> Vap. D.: <u>N/A</u> Vap. P.: <u>5mm</u> H ₂ O Sol.: <u>Insoluble</u> Other:	<input type="checkbox"/> CA <input checked="" type="checkbox"/> PEL <u>NONE</u> <input type="checkbox"/> TLV <input type="checkbox"/> IDLH <input type="checkbox"/> Only toxicological data available <input checked="" type="checkbox"/> Other: <u>NIOSH PEL 100 mg/m³</u>	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other:	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> OGI <input type="checkbox"/> OVA <input type="checkbox"/> _____
CAS No: 8008-20-6		Incompatible With: STRONG OXIDIZERS					
Synonyms: RANGE OIL, FUEL OIL NO. 1						Symptoms: IRRIT. EYES, SKIN, NAS., THROAT, BURNING SENSATION IN CHEST; HEAD, NAUSEA, WEAK, RESTLESS, INCO., COUGH, DROWN; VOMIT, DIARR.; DERM; CHEMICAL PNEUM.	IP: ? % Response:

HEALTH AND SAFETY EVALUATION - CHEMICAL HAZARDS

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
LEAD	<input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: N/A FP: N/A LEL: N/A UEL: N/A Auto. Ig.: N/A BP: 3164°F MP: 621°F Sp. Gr.: 11.34 Vap. D.: Vap. P.: 0.001 H ₂ O Sol.: INSOLUBLE Other:	<input type="checkbox"/> CA <input checked="" type="checkbox"/> PEL 0.050 mg/m ³ <input type="checkbox"/> TLV <input checked="" type="checkbox"/> IDLH 100 mg/m ³ <input type="checkbox"/> Only toxicological data available <input checked="" type="checkbox"/> Other: NIOSH REL 0.1 mg/m ³	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other:	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> CGI <input type="checkbox"/> OVA <input checked="" type="checkbox"/> Air Sample
CAS No: 7439-92-1		Incompatible With: Strong Oxidizers, Hydrogen Peroxide, Acids				Symptoms: Weak, Lass, Incoord; Facial Pallor; Pale Eye, Anor, Low-Wgt, Malnut; Constip, Abdom Pain, Colic; Anemia; Gingival Lead Line; Tremor; Pain Wrist, Ankles; Encephalopathy; Kidney Disease; Irrit Eyes; Hypotension	IP: N/A % Response: N/A
Synonyms: LEAD METAL Plumbum							

HEALTH AND SAFETY EVALUATION - CHEMICAL HAZARDS							
Hazardous Substance/Task	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
SULFURIC ACID	<input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input checked="" type="checkbox"/> Corrosive <input checked="" type="checkbox"/> Reactive <input checked="" type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: < 2 FP: N/A UEL: N/A UEL: N/A Auto. Ig.: BP: 554°F MP: — Sp. Gr.: 1.84 Vap. D.: Vap. P.: 0.001 mm H ₂ O Sol: Miscible Other:	<input type="checkbox"/> CA <input checked="" type="checkbox"/> PEL 1 mg/m ³ <input type="checkbox"/> TLV <input checked="" type="checkbox"/> IDLH 15 mg/m ³ <input type="checkbox"/> Only toxicological data available <input checked="" type="checkbox"/> Other: NIOSH REL 1 mg/m ³	<input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other:	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> CGI <input type="checkbox"/> OVA <input type="checkbox"/> _____
CAS No: 7664-93-9		Incompatible With: Organic materials; chlorates; carbides; fulminates; water; powdered metals				Symptoms: Irritated Eyes, skin, nose, throat; bronchitis; pulmonary edema; conjunctivitis; emphysema; stomatitis; eye, skin burns	IP: 7 % Response:
Synonyms: Battery Acid; Hydrogen Sulfate; Oil of Vitriol	Ignites finely particled metals						

HEALTH AND SAFETY EVALUATION — CHEMICAL HAZARDS

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/Ionization Potential + % Response
Asbestos CAS No: 1332-21-4 Synonyms: ACTINOLITE ANNITE ANTHOPHYLLITE CROCIDOLITE TREMOLITE	<input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input checked="" type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: N/A FP: N/A LEL: N/A UEL: N/A Auto. Ig.: N/A BP: DECOMPOSES MP: 112°F Sp. Gr.: ? Vap. D.: N/A Vap. P.: 0MM H ₂ O Sol.: INSOLUBLE Other:	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> PEL 1 FIBER/CM ³ <input type="checkbox"/> TLV <input type="checkbox"/> IDLH <input type="checkbox"/> Only toxicological data available <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other: Symptoms: ASBESTOS (CHRONIC EXPOSURE): DYSPNOEA, INTERSTITIAL FIB, RESTRICTED PALM FUNCTION, FINGER CLIPPING; FIRST EYES; [LUNG]	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> CGI <input type="checkbox"/> OVA <input checked="" type="checkbox"/> AIR 2000 IP: N/A % Response: N/A

CORPORATE HEALTH AND SAFETY EVALUATION - CHEMICAL HAZARDS							
Hazardous Substance/Task	Physical Properties	Normal Physical State	State At Site/Pres. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/Symptoms	Monitoring Instruments/ Ionization Potential + % Response
CHLOROPHYNYL	<input type="checkbox"/> Explosive <input type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Reactive <input type="checkbox"/> Water Reactive <input type="checkbox"/> Oxidizer <input type="checkbox"/> Radioactive <input type="checkbox"/> Other	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	<input type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas	pH: <i>N/A</i> FP: <i>N/A</i> LEL: <i>N/A</i> UEL: <i>N/A</i> Auto. Ig: <i>N/A</i> BP: <i>689-734°F</i> MP: <i>26°F</i> Sp. Gr.: <i>1.38</i> Vap. D.: <i>N/A</i> Vap. P.: <i>0.0006 mm</i> H ₂ O Sol: <i>Insoluble</i> Other:	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> PEL <i>1 mg/m³</i> <input type="checkbox"/> TLV <input checked="" type="checkbox"/> IDLH <i>5 mg/m³</i> <input type="checkbox"/> Only toxicological data available <input checked="" type="checkbox"/> Other: <i>NIOSH PEL 0.001 mg/m³</i>	<input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Contact <input type="checkbox"/> Direct Penetration <input type="checkbox"/> Other:	<input type="checkbox"/> PID <input type="checkbox"/> 11.7 eV <input type="checkbox"/> 10.2 eV <input type="checkbox"/> OVM <input type="checkbox"/> CCI <input type="checkbox"/> OVA <input type="checkbox"/> _____
CAS No: <i>11097-69-1</i>		Incompatible With: <i>STRONG OXIDIZERS</i>				Symptoms: <i>IRRIT EYES; CHLORACNE; LIVER DAMAGE; REPRO EFFECTS; [CANC]</i>	IP: <i>?</i> % Response: <i>N/A</i>
Synonyms: <i>ATROCLOR® 1254, PCB, POLYCHLORINATED BIPHENYL</i>							

ATTACHMENT 'B'

MATERIAL SAFETY DATA SHEETS
(MSDS)

EXXON COMPANY USA
A DIVISION OF EXXON CORPORATION

DATE ISSUED. C8/15/89
SUPERSEDES DATE. C6/01/89

MATERIAL SAFETY DATA SHEET

EXXON COMPANY, U.S.A. P.O. BOX 2180 HOUSTON, TX 77252-2180

A. IDENTIFICATION AND EMERGENCY INFORMATION

PRODUCT NAME
EXXON DIESEL 2

PRODUCT CODE
072700 - 00787

CHEMICAL NAME
Petroleum Distillate Fuel

CAS NUMBER
68476-34-6

PRODUCT APPEARANCE AND ODOR
Clear liquid, yellow color
Faint petroleum hydrocarbon odor

MEDICAL EMERGENCY TELEPHONE NUMBER
(713) 656-3424

B. COMPONENTS AND HAZARD INFORMATION

COMPONENTS	CAS NO. OF COMPONENTS	APPROXIMATE CONCENTRATION
Diesel Fuel No. 2	68476-34-6	100%

This product and all components are listed on the U.S. TSCA inventory.

See Section E for Health and Hazard Information.

See Section H for additional Environmental Information.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS)

Health	Flammability	Reactivity	HAZARD BASIS
1	2	0	Recommended by Exxon

EXPOSURE LIMIT FOR TOTAL PRODUCT
100 ppm (900 mg/m³) for an 8-hour workday

HAZARD BASIS
Recommended by Exxon

C. PRIMARY ROUTES OF ENTRY AND EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT

If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

SKIN

In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water.

INHALATION

Overexposure may cause gasping, nausea and disorientation.

Vapor pressure is very low. Vapor inhalation under ambient conditions is normally not a problem. If overcome by vapor from hot product, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation, administer oxygen, if available.

INGESTION

If ingested, DO NOT induce vomiting; call a physician immediately.

D. FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT (MINIMUM)

IMBUSTIBLE - Per DOT 49 CFR 173.115

5°C (40°F)

ASTM D 93, Pensky Martens Closed Cup

AUTOIGNITION TEMPERATURE

Greater than 204°C (400°F)

NOTE: Non-marine product may be 52°C (125°F)

Minimum flash to meet No. 2 Diesel Fuel Oil

ASTM D 975). Seasonal blends may be as low as 38°C (100°F).

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - HAZARD IDENTIFICATION

Health Flammability Reactivity

BASIS

Recommended by the National Fire Protection Association

0

2

0

HANDLING PRECAUTIONS

This liquid is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode.

Keep product away from ignition sources, such as heat, sparks, pilot lights, static electricity, and open flames.

FLAMMABLE OR EXPLOSIVE LIMITS (APPROXIMATE PERCENT BY VOLUME IN AIR)

Estimated values: Lower Flammable Limit 0.9%

Upper Flammable Limit 7%

EXTINGUISHING MEDIA AND FIRE FIGHTING PROCEDURES

Foam, water spray (fog), dry chemical, carbon dioxide and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this type of product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.

The following procedures for this type of product are based on the recommendations in the National Fire Protection Association's "Fire Protection Guide on Hazardous Materials", Eighth Edition (1984):

Use dry chemical, foam or carbon dioxide to extinguish the fire. Water may be ineffective, but water should be used to keep fire-exposed containers cool. If a leak or spill has ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

NOTE: The inclusion of the phrase "water may be ineffective" is to indicate that although water can be used to cool and protect exposed material, water may not extinguish the fire unless used under favorable conditions by experienced fire fighters trained in fighting all types of flammable liquid fires.

COMPOSITION PRODUCTS UNDER FIRE CONDITIONS

Fumes, smoke, carbon monoxide, aldehydes and other decomposition products, in the case of incomplete combustion.

"EMPTY" CONTAINER WARNING

"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION: THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to Occupational Safety and Health Administration regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

E HEALTH AND HAZARD INFORMATION

VARIABILITY AMONG INDIVIDUALS

Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

EFFECTS OF OVEREXPOSURE (Signs and symptoms of exposure)

Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to possible irritation and dermatitis.

High vapor concentrations (greater than approximately 1000 ppm, attainable at temperatures well above ambient) are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

NATURE OF HAZARD AND TOXICITY INFORMATION

Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; however, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

Lifetime skin painting studies conducted by the American Petroleum Institute, Exxon and others have shown that similar products boiling between 175-370°C (350-700°F) usually produce skin tumors and/or skin cancer in laboratory mice. The degree of carcinogenic response was weak to moderate with a relatively long latent period. The implications of these results for humans have not been determined.

Limited studies on oils that are very active carcinogens have shown that washing the animals' skin with soap and water between applications greatly reduces tumor formation. These studies demonstrate the effectiveness of cleansing the skin after contact.

Potential risks to humans can be minimized by observing good work practices and personal hygiene procedures generally recommended for petroleum products. See Section I for recommended protection and precautions.

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapors in the same naphtha boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats and male and female mice and in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. It is therefore highly unlikely that the kidney effects observed in male rats have significant implications for humans exposed at or below the recommended vapor limits in the workplace.

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (rat) greater than 5 g/kg of body weight, and an acute dermal LD50 (rabbit) greater than 2.16 g/kg of body weight.

Inhalation of components of exhaust from burning, such as carbon monoxide, may cause death at high concentrations.

Long-term repeated exposure of laboratory animals to whole diesel exhaust has resulted in an increased incidence of lung cancer.

Exposure to exhaust from burning and diesel exhaust should be minimized.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Petroleum Solvents/Petroleum Hydrocarbons - Skin contact may aggravate an existing dermatitis.

F. PHYSICAL DATA

The following data are approximate or typical values and should not be used for precise design purposes.

BOILING RANGE
160-350°C (320-650°F)

VAPOR PRESSURE
Less than 1 mm Hg @ 20°C

SPECIFIC GRAVITY (15.6 C/15.6 C)
(.86)

VAPOR DENSITY (AIR = 1)
Greater than 5

MOLECULAR WEIGHT
Approximately 212 average

PERCENT VOLATILE BY VOLUME
100

pH
Essentially neutral

EVAPORATION RATE @ 1 ATM. AND 25 C (77 F)
(n-BUTYL ACETATE = 1)
0.02

POUR, CONGEALING OR MELTING POINT
-18°C (0°F)
Pour Point by ASTM D 97

SOLUBILITY IN WATER @ 1 ATM. AND 25 C (77 F)
Negligible; less than 0.1%

VISCOSITY
2 cSt @ 40°C

G. REACTIVITY

This product is stable and will not react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium hypochlorite.

H. ENVIRONMENTAL INFORMATION

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Shut off and eliminate all ignition sources. Keep people away. Recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize breathing vapors. Minimize skin contact. Ventilate confined spaces. Open all windows and doors. Keep product out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas. Assure conformity with applicable governmental regulations. Continue to observe precautions for volatile, combustible vapors from absorbed material.

THE FOLLOWING INFORMATION MAY BE USEFUL IN COMPLYING WITH VARIOUS STATE AND FEDERAL LAWS AND REGULATIONS UNDER VARIOUS ENVIRONMENTAL STATUTES:

REPORTABLE QUANTITY (RQ), EPA REGULATION 40 CFR 302 (CERCLA Section 102)
No RQ for product or any constituent greater than 1% or 0.1% (carcinogen).

THRESHOLD PLANNING QUANTITY (TPQ), EPA REGULATION 40 CFR 355 (SARA Sections 301-304)
No TPQ for product or any constituent greater than 1% or 0.1% (carcinogen).

TOXIC CHEMICAL RELEASE REPORTING, EPA REGULATION 40 CFR 372 (SARA Section 313)
No toxic chemical is present greater than 1% or 0.1% (carcinogen).

HAZARDOUS CHEMICAL REPORTING, EPA REGULATION 40 CFR 370 (SARA Sections 311-312)

	Acute	Chronic	Fire	Pressure	Reactive	Not Applicable
EPA HAZARD CLASSIFICATION CODE:	Hazard	Hazard	Hazard	Hazard	Hazard	
		XXX	XXX			

I. PROTECTION AND PRECAUTIONS

VENTILATION

Use only with ventilation sufficient to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air.

RESPIRATORY PROTECTION

Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

PROTECTIVE GLOVES

Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact.

EYE PROTECTION

Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT

Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing, which could result in prolonged or repeated skin contact.

WORK PRACTICES / ENGINEERING CONTROLS

Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants.

In order to prevent fire or explosion hazards, use appropriate equipment.

Information on electrical equipment appropriate for use with this product may be found in the latest edition of the National Electrical Code (NFPA-70). This document is available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

PERSONAL HYGIENE

Minimize breathing vapor, mist or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean before re-use; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water.

J. TRANSPORTATION AND OSHA RELATED LABEL INFORMATION

TRANSPORTATION INCIDENT INFORMATION

For further information relative to spills resulting from transportation incidents, refer to latest Department of Transportation Emergency Response Guidebook for Hazardous Materials Incidents, DOT P 5800.3.

DOT IDENTIFICATION NUMBER

Fuel Oil, No. 2 / Combustible Liquid / NA 1993

OSHA REQUIRED LABEL INFORMATION

In compliance with hazard and right-to-know requirements, the following OSHA Hazard Warnings should be found on a label, bill of lading or invoice accompanying this shipment.

DANGER!

COMBUSTIBLE

**LONG-TERM, REPEATED EXPOSURE MAY
CAUSE SKIN CANCER**

Note: Product label will contain additional non-OSHA related information.

The information and recommendations contained herein are, to the best of Exxon's knowledge and belief, accurate and reliable as of the date issued. Exxon does not warrant or guarantee their accuracy or reliability, and Exxon shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal council should be consulted to insure proper health, safety and other necessary information is included on the container.

The Environmental Information included under Section H hereof as well as the Hazardous Materials Identification System (HMIS) and National Fire Protection Association (NFPA) ratings have been included by Exxon Company, U.S.A. in order to provide additional health and hazard classification information. The ratings recommended are based upon the criteria supplied by the developers of these rating systems, together with Exxon's interpretation of the available data.

FOR ADDITIONAL INFORMATION ON HEALTH

EFFECTS CONTACT:

DIRECTOR OF INDUSTRIAL HYGIENE
EXXON COMPANY, U.S.A.
P. O. BOX 2180 ROOM 3157
HOUSTON, TX 77252-2180
(713) 656-2443

FOR OTHER PRODUCT INFORMATION CONTACT:

MANAGER, MARKETING TECHNICAL SERVICES
EXXON COMPANY, U.S.A.
P. O. BOX 2180 ROOM 2355
HOUSTON, TX 77252-2180
(713) 656-5949

J.T.BAKER MSDS
MSDS for CRESOL

1 -PRODUCT IDENTIFICATION

PRODUCT NAME: CRESOL
COMMON SYNONYMS: CRESYLIC ACID; CRYSYLLOL; TRICRESOL
CHEMICAL FAMILY: PHENOLS
FORMULA: C7H8O
FORMULA WT.: 108.14
CAS NO.: 1319-77-3
NIOSH/RTECS NO.: G05950000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 1754,1754

CHEMTREC # (800) 424-9300
NATIONAL RESPONSE CENTER # (800) 424-8802
J.T.BAKER INC.
222 RED SCHOOL LANE
PHILLIPSBURG, NJ 08865
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 01/04/94 ISSUED: 06/19/96
REVISION #03

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	2	MODERATE
REACTIVITY	-	1	SLIGHT
CONTACT	-	3	SEVERE (LIFE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

DANGER

COMBUSTIBLE. CAUSES SEVERE BURNS. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.

KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

J.T.BAKER MSDS
MSDS for CRESOL

1 -PRODUCT IDENTIFICATION (continued)

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

2 -COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
CRESOL	1319-77-3	90-100	5 PPM	5 PPM

3 -PHYSICAL DATA

BOILING POINT: 201 C (393 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): 0.1
(20 C)

MELTING POINT: N/A

VAPOR DENSITY (AIR=1): 3.7

SPECIFIC GRAVITY: 1.04
(H2O=1)

EVAPORATION RATE: N/A

LUBILITY(H2O): MODERATE (1-10%)

% VOLATILES BY VOLUME: 0
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: COLORLESS TO AMBER LIQUID. PHENOLIC ODOR.

4 -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): 86 C (187 F)

NFPA 704M RATING: 3-2-0

AUTOIGNITION TEMPERATURE: 598 C (1110 F)

FLAMMABLE LIMITS: UPPER - 1.4 % LOWER - 1.1 %

FIRE EXTINGUISHING MEDIA

USE WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL OR ORDINARY FOAM.

J.T.BAKER MSDS
MSDS for CRESOL

4 -FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

5 -HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 22 MG/M3 (5 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 22 MG/M3 (5 PPM)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR CRESOL

1454 MG/KG

SKIN RABBIT LD50 FOR CRESOL

2000 MG/KG

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY

NONE IDENTIFIED.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS, MAY CAUSE PULMONARY EDEMA

J.T.BAKER MSDS
MSDS for CRESOL

-HEALTH HAZARD DATA (continued)

SKIN CONTACT: SEVERE IRRITATION OR BURNS
EYE CONTACT: SEVERE IRRITATION OR BURNS
SKIN ABSORPTION: DERMATITIS
INGESTION: IS HARMFUL AND MAY BE FATAL. NAUSEA, VOMITING,
GASTROINTESTINAL IRRITATION, BURNS TO MOUTH AND THROAT
CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, LUNGS, BLOOD, CENTRAL NERVOUS
SYSTEM

TARGET ORGANS

NASAL SEPTUM, RESPIRATORY SYSTEM, LIVER, KIDNEYS, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, ABSORPTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF
CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE
OXYGEN. PROMPT ACTION IS ESSENTIAL.
SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.
EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS CRESOL (RQ = 1000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS CRESOL (MIXED ISOMERS)

GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91

TSCA INVENTORY: YES

J.T.BAKER MSDS
MSDS for CRESOL

6 -REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT

INCOMPATIBLES: STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

7 -SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U052 (TOXIC WASTE)

8 -INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 250 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE AND DUST/MIST FILTER IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

J.T.BAKER MSDS
MSDS for CRESOL

9 -STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA OR CABINET. STORE IN LIGHT-RESISTANT CONTAINERS.

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: CRESOL

HAZARD CLASS: 6.1, 8

UN/NA: UN2076 REPORTABLE QUANTITY: 100 LBS. PACKAGING GROUP: II

LABELS: 6 POISON, CORROSIVE

REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CRESOL

HAZARD CLASS: 6.1, 8

UN: UN2076 MARINE POLLUTANTS: YES

LABELS: 6 TOXIC, CORROSIVE

REGULATORY REFERENCES: 49CFR PART 176; IMDG CODE

I.M.O. PAGE: 6114

PACKAGING GROUP: II

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CRESOL

HAZARD CLASS: 6.1, 8

UN: UN2076

PACKAGING GROUP: II

LABELS: 6 POISON, CORROSIVE

REGULATORY REFERENCES: 49CFR PART 175; ICAO=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 171.2, CERTIFICATION 172.204, AND EMPLOYEE TRAINING 49 CFR 173.1(B).

J.T. BAKER MSDS
MSDS for CRESOL

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION (continued)

U.S. CUSTOMS HARMONIZATION NUMBER: 29071200006

EPA/TSCA EXPORT NOTIFICATION
YES

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.

-N/A = NOT APPLICABLE, OR NOT AVAILABLE; -N/E = NOT ESTABLISHED

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NOTE: CHEMTREC, CANUTEC AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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APPROVED BY QUALITY ASSURANCE DEPARTMENT.

**J.T.BAKER MSDS
MSDS for SULFURIC ACID****-PRODUCT IDENTIFICATION**

PRODUCT NAME: SULFURIC ACID
COMMON SYNONYMS: OIL OF VITRIOL; HYDROGEN SULFATE; SULPHURIC ACID
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: H2SO4
FORMULA WT.: 98.08
CAS NO.: 7664-93-9
NIOSH/RTECS NO.: WS5600000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9681,9694,9686,5815,9691,9673,4802,5340,9688,9685,9675,9687
5137,9680,9683,5432,9682,6902,9679,9693,5030,9676,9674,5802
9684,5374,5643,5837

CHEMTREC # (800) 424-9300
NATIONAL RESPONSE CENTER # (800) 424-8802
J.T.BAKER INC.
222 RED SCHOOL LANE
PHILLIPSBURG, NJ 08865
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 04/02/96 **ISSUED:** 06/19/96
REVISION #07

PRECAUTIONARY LABELING**BAKER SAF-T-DATA* SYSTEM**

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (WATER REACTIVE)
CONTACT	-	4	EXTREME (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING**POISON DANGER**

CAUSES SEVERE BURNS. REACTS VIOLENTLY WITH WATER. HARMFUL IF SWALLOWED OR INHALED. CONTACT WITH OTHER MATERIALS MAY CAUSE FIRE.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN DRY CONTAINER.

PRECAUTIONARY LABELING (CONTINUED)**INTERNATIONAL LABELING**

J.T.BAKER MSDS
MSDS for SULFURIC ACID**1 -PRODUCT IDENTIFICATION (continued)**

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA* STORAGE COLOR CODE: WHITE (CORROSIVE)

2 -COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TL
SULFURIC ACID	7664-93-9	80-98	1 MG/M3	1 MG/M3
WATER	7732-18-5	2-20	N/E	N/E

3 -PHYSICAL DATA

BOILING POINT: 327 C (620 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): <0.3
(20 C)

MELTING POINT: -2 C (28 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): 3.4

SPECIFIC GRAVITY: 1.84
(H2O=1)

EVAPORATION RATE: <1
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: N/A
(21 C)

PH: 1.0 (0.05M SOLUTION)

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS TO YELLOW VISCOUS LIQUID. ODORLESS.

4 -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 3-0-2 W

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A

LOWER - N/A

J.T.BAKER MSDS
MSDS for SULFURIC ACID

4 -FIRE AND EXPLOSION HAZARD DATA (continued)

FIRE EXTINGUISHING MEDIA

USE DRY CHEMICAL OR CARBON DIOXIDE. DO NOT USE WATER.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. DO NOT GET WATER INSIDE CONTAINERS.

USUAL FIRE & EXPLOSION HAZARDS

REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED

SULFUR DIOXIDE, HYDROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

5 -HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 1 MG/M3

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR SULFURIC ACID

2140 MG/KG

INHALATION-2HR MOUSE LC50 FOR SULFURIC ACID

320 MG/M3

INHALATION-2HR RAT LC50 FOR SULFURIC ACID

510 MG/M3

INTRAPERITONEAL MOUSE LD50 FOR WATER

190 G/KG

INTRAVENOUS MOUSE LD50 FOR WATER

25 G/KG

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: YES OSHA REG: YES

CARCINOGENICITY

NONE IDENTIFIED.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

J.T.BAKER MSDS
MSDS for SULFURIC ACID

5 -HEALTH HAZARD DATA (continued)

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM,
PULMONARY EDEMA, LUNG INFLAMMATION

SKIN CONTACT: SEVERE BURNS

EYE CONTACT: SEVERE BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, SEVERE BURNS TO MOUTH, THROAT, AND
STOMACH, KIDNEY DISFUNCTION

CHRONIC EFFECTS: LUNG DAMAGE

TARGET ORGANS

RESPIRATORY SYSTEM, LUNGS, EYES, SKIN, TEETH, KIDNEYS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

RESPIRATORY SYSTEM DISEASE

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF
CONSCIOUS, GIVE LARGE AMOUNTS OF WATER.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE
OXYGEN. PROMPT ACTION IS ESSENTIAL.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) CLASSIFIED "STRONG
INORGANIC ACID MISTS CONTAINING SULFURIC ACID" AS A CATEGORY 1 CARCINOGEN,
A SUBSTANCE THAT IS "CARCINOGENIC TO HUMANS." THIS CLASSIFICATION IS FOR
INORGANIC ACID MISTS ONLY AND DOES NOT APPLY TO SULFURIC ACID OR SULFURIC
ACID SOLUTIONS. THE BASIS FOR THE IARC CLASSIFICATION RESTS ON SEVERAL
EPIDEMIOLOGY STUDIES WHICH HAVE SEVERAL DEFICIENCIES. THESE STUDIES DID
NOT ACCOUNT FOR EXPOSURE TO OTHER SUBSTANCES, SOME KNOWN TO BE ANIMAL OR

J.T.BAKER MSDS
MSDS for SULFURIC ACID

5 -HEALTH HAZARD DATA (continued)

POTENTIAL HUMAN CARCINOGENS, SOCIAL INFLUENCES (SMOKING OR ALCOHOL CONSUMPTION) AND INCLUDED SMALL NUMBERS OF SUBJECTS. BASED ON THE OVERALL WEIGHT OF EVIDENCE FROM ALL HUMAN AND CHRONIC ANIMAL STUDIES, NO DEFINITIVE CAUSAL RELATIONSHIP BETWEEN SULFURIC ACID MIST EXPOSURE AND RESPIRATORY TRACT CANCER HAS BEEN SHOWN.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: YES

EXTREMELY HAZARDOUS SUBSTANCE: YES CONTAINS SULFUR ACID (RQ = 1,000 LBS, TPQ = 1,000 LBS)
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS SULFURIC ACID (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS: YES CONTAINS SULFURIC ACID
GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY: YES

6 -REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE. HEAT

COMPATIBLES: WATER, MOST COMMON METALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS, STRONG BASES, CARBONATES, SULFIDES, CYANIDES, STRONG OXIDIZING AGENTS, CARBIDES

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR, HYDROGEN

7 -SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. DO NOT USE WATER.
NEUTRALIZE SPILL AND/OR WASHINGS WITH SODA ASH OR LIME.
WITH CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER.
MOVE CONTAINER(S) FROM SPILL AREA.

J. T. BAKER NEUTRASORB(R) OR TEAM(R) 'LOW NA+' ACID NEUTRALIZERS ARE FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

J.T.BAKER MSDS
MSDS for SULFURIC ACID

7 -SPILL & DISPOSAL PROCEDURES (continued)

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

8 -INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

9 -STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: WHITE (CORROSIVE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT. ISOLATE FROM INCOMPATIBLE MATERIALS.

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: SULFURIC ACID (WITH MORE THAN 51% ACID)

HAZARD CLASS: 8

UN/NA: UN1830 REPORTABLE QUANTITY: 1000 LBS. PACKAGING GROUP: II

LABELS: 8 CORROSIVE

REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: SULPHURIC ACID (WITH MORE THAN 51% ACID)

HAZARD CLASS: 8

I.M.O. PAGE: 8230

UN: UN1830 MARINE POLLUTANTS: NO

PACKAGING GROUP: II

LABELS: 8 CORROSIVE

REGULATORY REFERENCES: 49CFR PART 176; IMDG CODE

J.T.BAKER MSDS
MSDS for SULFURIC ACID

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION (continued)

AIR (I.C.A.O.)

PROPER SHIPPING NAME: SULPHURIC ACID (WITH MORE THAN 51% ACID)

HAZARD CLASS: 8

UN: UN1830

PACKAGING GROUP: II

LABELS: 8 CORROSIVE

REGULATORY REFERENCES: 49CFR PART 175; ICAO=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR

171.2, CERTIFICATION 172.204, AND EMPLOYEE TRAINING 49 CFR 173.1(B).

U.S. CUSTOMS HARMONIZATION NUMBER: 28070000001

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.

-N/A = NOT APPLICABLE, OR NOT AVAILABLE; -N/E = NOT ESTABLISHED

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J.T.BAKER MSDS
MSDS for SULFURIC ACID

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION (continued)

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J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT**-PRODUCT IDENTIFICATION**

PRODUCT NAME: PCB RAPID ASSAY(R) KIT
COMMON SYNONYMS: N/A
CHEMICAL FAMILY: AQUEOUS SOLUTIONS
FORMULA: N/A
FORMULA WT.: N/A
CAS NO.: N/A
NIOSH/RTECS NO.: N/A
PRODUCT USE: ANALYTICAL TESTING
PRODUCT CODES: 2939

CHEMTREC # (800) 424-9300
NATIONAL RESPONSE CENTER # (800) 424-8802
J.T.BAKER INC.
222 RED SCHOOL LANE
PHILLIPSBURG, NJ 08865
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 07/07/94 ISSUED: 06/19/96
REVISION #01

PRECAUTIONARY LABELING**BAKER SAF-T-DATA* SYSTEM**

HEALTH	-	2	MODERATE
FLAMMABILITY	-	2	MODERATE
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT

U.S. PRECAUTIONARY LABELING**WARNING**

CORROSIVE. CAUSES IRRITATION. MAY CAUSE BURNS. HARMFUL IF INHALED. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED. FLAMMABLE
STORE AT 2-8 C. DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

**J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT****2 -COMPONENTS**

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
SULFURIC ACID	7664-93-9	19-21	1 MG/M3	1 MG/M3
WATER	7732-18-5	79-81	N/E	N/E
DIMETHYLFORMAMIDE	68-12-2	25-27	10 PPM	10 PPM
WATER	7732-18-5	73-75	N/E	N/E
TRIS (HYDROXYMETHYL) AMINOMETHANE	77-86-1	2-4	N/E	N/E
WATER	7732-18-5	96-98	N/E	N/E
METHANOL	67-56-1	49-51	200 PPM	200 PPM
WATER	7732-18-5	49-51	N/E	N/E

CONTAINS A TRACE AMOUNT OF PCB, AS CALIBRATION STANDARD. RAPID ASSAY(R) IS REGISTERED TRADEMARK OF OHMICRON.

3 -PHYSICAL DATA

BOILING POINT: N/A VAPOR PRESSURE (MMHG): N/A
MELTING POINT: N/A VAPOR DENSITY (AIR=1): N/A
SPECIFIC GRAVITY: N/A EVAPORATION RATE: N/A
(H2O=1)
SOLUBILITY(H2O): COMPLETE (100%) % VOLATILES BY VOLUME: >99
(21 C)
PH: N/A
ODOR THRESHOLD (P.P.M.): N/A PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A
APPEARANCE & ODOR: KIT CONTAINING SEPARATE VIALS OF SOLUTIONS/REAGENT

4 -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): 29 C (86 F)
AUTOIGNITION TEMPERATURE: N/A
FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A
FIRE EXTINGUISHING MEDIA
USE WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL OR ORDINARY FOAM.

J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT

-FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE-FIGHTING PROCEDURES
NONE IDENTIFIED.

UNUSUAL FIRE & EXPLOSION HAZARDS
SULFURIC ACID CAN DECOMPOSE TO FORM OXIDES OF SULFUR AND HYDROGEN GAS.

TOXIC GASES PRODUCED
OXIDES OF SULFUR, HYDROGEN, CARBON MONOXIDE, CARBON DIOXIDE, AMINES,
OXIDES OF NITROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

5 -HEALTH HAZARD DATA

THE TOXICOLOGICAL PROPERTIES OF THE KIT COMPONENTS HAVE NOT BEEN FULLY
DEFINED. CONTACT MAY CAUSE IRRITATION TO EYES, SKIN AND MUCOUS MEMBRANES. IF
INHALED OR INGESTED, IT MAY CAUSE IRRITATION. LIMIT EXPOSURE TO MATERIAL.

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3

TLV IS FOR SULFURIC ACID.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 1 MG/M3

PEL IS FOR SULFURIC ACID.

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR SULFURIC ACID	2140 MG/KG
INHALATION-2HR MOUSE LC50 FOR SULFURIC ACID	320 MG/M3
INHALATION-2HR RAT LC50 FOR SULFURIC ACID	510 MG/M3
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG
ORAL RAT LD50 FOR DIMETHYLFORMAMIDE	2800 MG/KG
SKIN RAT LD50 FOR DIMETHYLFORMAMIDE	5000 MG/KG
INTRAPERITONEAL RAT LD50 FOR DIMETHYLFORMAMIDE	1400 MG/KG
INTRAVENOUS RAT LD50 FOR DIMETHYLFORMAMIDE	2000 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG

J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT**5 -HEALTH HAZARD DATA (continued)**

INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG
ORAL RAT LD50 FOR TRIS(HYDROXYMETHYL)AMINOMETHANE	5900 MG/KG
INTRAVENOUS MOUSE LD50 FOR TRIS(HYDROXYMETHYL)AMINOMETHANE	1210 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG
ORAL RAT LD50 FOR METHANOL	5628 MG/KG
INTRAPERITONEAL RAT LD50 FOR METHANOL	9540 MG/KG
SUBCUTANEOUS MOUSE LD50 FOR METHANOL	9800 MG/KG
SKIN RABBIT LD50 FOR METHANOL	20 G/KG
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG
CARCINOGENICITY: NTP: NO IARC: YES Z LIST: YES OSHA REG: YES	

CARCINOGENICITY

DIMETHYLFORMAMIDE IS POSSIBLY CARCINOGENIC TO HUMANS (GROUP 2B).

REPRODUCTIVE EFFECTS

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY CAUSE FETAL DEATH.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, PULMONARY EDEMA, LUNG INFLAMMATION, HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS, MAY BE FATAL.

SKIN CONTACT: SEVERE BURNS, IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: SEVERE BURNS, IRRITATION

SKIN ABSORPTION: RAPID ABSORPTION, MAY BE FATAL.

INGESTION: NAUSEA, VOMITING, SEVERE BURNS TO MOUTH, THROAT, AND STOMACH, KIDNEY DISFUNCTION, HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION, MAY BE FATAL.

CHRONIC EFFECTS: LUNG DAMAGE, DAMAGE TO LIVER, KIDNEYS, BLOOD, CENTRAL NERVOUS SYSTEM

TARGET ORGANS

RESPIRATORY SYSTEM, LUNGS, EYES, SKIN, TEETH, KIDNEYS, LIVER, KIDNEYS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

RESPIRATORY SYSTEM DISEASE, LIVER DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT, ABSORPTION

J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT**-HEALTH HAZARD DATA (continued)****EMERGENCY AND FIRST AID PROCEDURES**

- INGESTION:** CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER.
- INHALATION:** IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. PROMPT ACTION IS ESSENTIAL.
- SKIN CONTACT:** IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.
- EYE CONTACT:** IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) CLASSIFIED "STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID" AS A CATEGORY 1 CARCINOGEN, A SUBSTANCE THAT IS "CARCINOGENIC TO HUMANS." THIS CLASSIFICATION IS FOR INORGANIC ACID MISTS ONLY AND DOES NOT APPLY TO SULFURIC ACID OR SULFURIC ACID SOLUTIONS. THE BASIS FOR THE IARC CLASSIFICATION RESTS ON SEVERAL EPIDEMIOLOGY STUDIES WHICH HAVE SEVERAL DEFICIENCIES. THESE STUDIES DID NOT ACCOUNT FOR EXPOSURE TO OTHER SUBSTANCES, SOME KNOWN TO BE ANIMAL OR POTENTIAL HUMAN CARCINOGENS, SOCIAL INFLUENCES (SMOKING OR ALCOHOL CONSUMPTION) AND INCLUDED SMALL NUMBERS OF SUBJECTS. BASED ON THE OVERALL WEIGHT OF EVIDENCE FROM ALL HUMAN AND CHRONIC ANIMAL STUDIES, NO

DEFINITIVE CAUSAL RELATIONSHIP BETWEEN SULFURIC ACID MIST EXPOSURE AND RESPIRATORY TRACT CANCER HAS BEEN SHOWN.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: YES

EXTREMELY HAZARDOUS SUBSTANCE:	YES	CONTAINS SULFURIC ACID (RQ = 1,000 LBS, TPQ = 1,000 LBS)
CERCLA HAZARDOUS SUBSTANCE:	YES	CONTAINS SULFURIC ACID (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS:	YES	CONTAINS SULFURIC ACID
GENERIC CLASS:		GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY:	YES	

6 -REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

**J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT**

6 -REACTIVITY DATA (continued)

CONDITIONS TO AVOID: MOISTURE. HEAT, HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: NONE IDENTIFIED, MOST COMMON METALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS, STRONG BASES, CARBONATES, SULFIDES, CYANIDES, STRONG OXIDIZING AGENTS, CARBIDES

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR, HYDROGEN, CARBON MONOXIDE, CARBON DIOXIDE, AMINES, OXIDES OF NITROGEN

7 -SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
FLUSH AREA WITH FLOODING AMOUNTS OF WATER. (USE CAUTION)

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 -INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP VAPOR AND MIST LEVELS AS LOW AS POSSIBLE.

EYE/SKIN PROTECTION: THIS IS A LABORATORY-USE PRODUCT FOR WHICH NO INDUSTRIAL PROTECTIVE EQUIPMENT HAS BEEN DESIGNATED.

9 -STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

STORAGE REQUIREMENTS
STORE AT 0-21 C.

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

J.T.BAKER MSDS
MSDS for PCB RAPID ASSAY(R) KIT

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION (continued)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

MARINE POLLUTANTS: NO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

U.S. CUSTOMS HARMONIZATION NUMBER: 3822000000

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.

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J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT

1 -PRODUCT IDENTIFICATION

PRODUCT NAME: LEAD, GRANULAR OR SHOT
COMMON SYNONYMS: C.I. 77575
CHEMICAL FAMILY: METALS
FORMULA: PB
FORMULA WT.: 207.20
CAS NO.: 7439-92-1
NIOSH/RTECS NO.: OF7525000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 2266,2256,4996

CHEMTREC # (800) 424-9300
NATIONAL RESPONSE CENTER # (800) 424-8802
J.T.BAKER INC.
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24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 02/02/94 ISSUED: 06/19/96
REVISION #06

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (LIFE)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

HARMFUL IF INHALED. MAY CAUSE IRRITATION. MAY BE FATAL IF SWALLOWED.
EXCEPTIONAL HEALTH HAZARD. BEFORE USING, READ MATERIAL SAFETY DATA SHEET
(MSDS) FOR THIS MATERIAL.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE DUST. KEEP IN
TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY
AFTER HANDLING.

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH
PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT

2 -COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
LEAD	7439-92-1	87-99	0.05 MG/M3	0.05 MG/M3
ANTIMONY	7440-36-0	0.5-5	0.5 MG/M3	0.5 MG/M3
ARSENIC	7440-38-2	.01-.5	0.01 MG/M3	0.2 MG/M3

3 -PHYSICAL DATA

BOILING POINT: 1744 C (3171 F)
(AT 760 MM HG) VAPOR PRESSURE (MMHG): N/A

MELTING POINT: 327 C (620 F)
(AT 760 MM HG) VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 11.3
(H2O=1) EVAPORATION RATE: N/A

SOLUBILITY(H2O): NEGLIGIBLE (<0.1%) % VOLATILES BY VOLUME: 0
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A PHYSICAL STATE: SOLID

EFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: WHITE TO GRAY METAL. ODORLESS.

4 -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS

NONE IDENTIFIED.

J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT

4 -FIRE AND EXPLOSION HAZARD DATA (continued)

TOXIC GASES PRODUCED
LEAD FUMES

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

5 -HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 0.15 MG/M3

TLV IS FOR LEAD, INORGANIC DUSTS AND FUMES, AS PB.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.05 MG/M3

PEL IS FOR LEAD, INORGANIC DUSTS AND FUMES, AS PB.

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR ANTIMONY	7	G/KG
INTRAPERITONEAL RAT LD50 FOR ANTIMONY	100	MG/KG
INTRAPERITONEAL GUINEA PIG LD50 FOR ANTIMONY	150	MG/KG
ORAL RAT LD50 FOR ARSENIC	15.1	MG/KG
CARCINOGENICITY: NTP: NO IARC: YES Z LIST: YES OSHA REG: YES		

CARCINOGENICITY

IARC HAS LISTED THIS MATERIAL IN GROUP 2B AS POSSIBLE CARCINOGENIC TO HUMANS.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: IRRITATION OF UPPER RESPIRATORY TRACT, MAY CAUSE ANEMIA, NAUSEA, VOMITING, GASTROINTESTINAL IRRITATION, DIARRHEA, WEAKNESS, WEIGHT LOSS, CONVULSIONS

SKIN CONTACT: IRRITATION

EYE CONTACT: IRRITATION

J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT**5 -HEALTH HAZARD DATA (continued)**

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: ANEMIA, NAUSEA, VOMITING, GASTROINTESTINAL IRRITATION, PARALYSIS, CENTRAL NERVOUS SYSTEM DEPRESSION

CHRONIC EFFECTS: DAMAGE TO BLOOD FORMING TISSUE, ANEMIA, KIDNEY DAMAGE, BLURRED VISION, LEAD BUILD-UP IN THE CENTRAL NERVOUS SYSTEM

TARGET ORGANS

GI TRACT, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD, GINGIVAL TISSUE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

KIDNEY DISORDERS, LIVER DISORDERS, CENTRAL NERVOUS SYSTEM DISORDERS

PRIMARY ROUTES OF ENTRY

INGESTION, INHALATION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

INHALATION: IF INHALED IN LARGE AMOUNTS, MOVE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

- ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS LEAD (RQ = 1 LB) AND ANTIMONY (RQ = 5000LBS) AND ARSENIC (RQ = 1 LB)

SARA 313 TOXIC CHEMICALS: YES CONTAINS ANTIMONY, ARSENIC, AND LEAD
GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91

- TSCA INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING: THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT

6 -REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: STRONG OXIDIZING AGENTS, POTASSIUM, SODIUM, STRONG ACIDS, STRONG BASES, STRONG REDUCING AGENTS

DECOMPOSITION PRODUCTS: LEAD FUMES

7 -SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D008 (EP TOXIC WASTE)

8 -INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, PROPER GLOVES ARE RECOMMENDED.

9 -STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

J.T.BAKER MSDS
MSDS for LEAD, GRANULAR OR SHOT

9 -STORAGE AND HANDLING PRECAUTIONS (continued)

SPECIAL PRECAUTIONS
AVOID CREATING DUST.

10 -TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)
MARINE POLLUTANTS: NO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

U.S. CUSTOMS HARMONIZATION NUMBER: 78042000009

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING.

N/A = NOT APPLICABLE, OR NOT AVAILABLE; -N/E = NOT ESTABLISHED

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NOTE: CHEMTREC, CANUTEC AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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ATTACHMENT 'C'

SAFETY PROCEDURES/FIELD OPS
(ELDOP'S)

ATTACHMENT 'D'

SITE SPECIFIC HAZARD COMMUNICATION PROGRAM

In order to ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will utilize this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communications Program as a means of meeting site or location specific requirements.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following hazardous information program has been established. All affected personnel will participate in the hazard communication program. This written program as well as WESTON's Corporate Hazard Communication Program will be available for review by any employee, employee representative, representative of OSHA, NIOSH or any affected employer/employee on a multi-employer site.

WESTON notified of other employer's or clients hazard communication program as necessary.

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or in a centrally identified location with the MSDS's. Further information on each chemical may be obtained by reviewing the appropriate MSDS's. The list will be arranged to enable cross reference with the MSDS file and the label on the container. The SO or location manager is responsible for ensuring the chemical listing remains up-to-date.

The SO is responsible for ensuring labels are placed where required and for comparing MSDS's and other information with label information to ensure correctness.

A log for, and copies of, MSDS's for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDS's will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or designated alternate. When revised MSDS's are received the SO will immediately replace the old MSDS's.

Employee Training and Information

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site or whenever a new hazard is introduced into the work area employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the worksite
- Physical and health risks of the hazardous chemicals
- The signs and symptoms of overexposure
- Procedures to follow if employees are overexposed to hazardous chemicals
- Location of the MSDS file and written hazard communication program
- How to determine the presence or release of hazardous chemicals in the employees work area
- How to read labels and review MSDS's to obtain hazard information
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals
- How to reduce or prevent exposure to hazardous chemicals through use of controls procedures, work practices and personal protective equipment
- Hazardous, non-routine tasks to be performed (if any)
- Chemicals within unlabeled piping (if any)

Hazardous Non-Routine Tasks

When employees are required to perform hazardous non-routine tasks the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may utilize during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee and emergency procedures.

Chemicals in Unlabeled Pipes

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee shall contact the SO at which time information as to: the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and safety precautions which should be taken will be determined and presented.

Multi-Employer Worksites

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of SO and the site manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers as requested. MSDS's will be available for viewing as necessary.

The location, format and/or procedures for accessing MSDS information must be relayed to affected employees.

TRAINING AND BRIEFING TOPICS

The following items will be covered at the site specific training meeting, daily or periodically.

<input checked="" type="checkbox"/> Site characterization and analysis, Sec. 3.0; 29 CFR 1910.120 i	<input type="checkbox"/> Level A
<input checked="" type="checkbox"/> Physical hazards, Table 3.2	<input type="checkbox"/> Level B
<input checked="" type="checkbox"/> Chemical hazards, Table 3.1	<input checked="" type="checkbox"/> Level C (ASBESTOS)
<input checked="" type="checkbox"/> Animal bites, stings, and poisonous plants	<input checked="" type="checkbox"/> Level D
<input checked="" type="checkbox"/> Etiologic (infectious) agents	<input checked="" type="checkbox"/> Monitoring, Sec. 7.0; 29 CFR 1910.120 h
<input checked="" type="checkbox"/> Site control, Sec. 8.0; 29 CFR 1910.120 d	<input checked="" type="checkbox"/> Decontamination, Sec. 9.0; 29 CFR 1910.120 k
<input checked="" type="checkbox"/> Engineering controls and work practices, Sec. 8.5; 29 CFR 1910.120 g	<input checked="" type="checkbox"/> Emergency responses, Sec. 10.0; 29 CFR 1910.120 l
<input checked="" type="checkbox"/> Heavy machinery	<input checked="" type="checkbox"/> Elements of an emergency response, Sec. 10.0; 29 CFR 1910.120 l
<input type="checkbox"/> Fall protection	<input checked="" type="checkbox"/> Procedures for handling site emergency incidents, Sec. 10.0; 29 CFR 1910.120 l
<input checked="" type="checkbox"/> Backflow	<input checked="" type="checkbox"/> Offsite emergency response, 29 CFR 1910.120 l
<input checked="" type="checkbox"/> Equipment	<input checked="" type="checkbox"/> Handling drums and containers, 29 CFR 1910.120 j
<input checked="" type="checkbox"/> Tools	<input checked="" type="checkbox"/> Opening drums and containers
<input type="checkbox"/> Ladder 29 CFR 1910.27 d	<input checked="" type="checkbox"/> Electrical material handling equipment
<input checked="" type="checkbox"/> Overhead and underground utilities	<input type="checkbox"/> Radioactive waste
<input type="checkbox"/> Scaffolds	<input type="checkbox"/> Shock sensitive waste
<input checked="" type="checkbox"/> Structural integrity	<input type="checkbox"/> Laboratory waste packs
<input checked="" type="checkbox"/> Unguarded openings - wall, floor, ceilings	<input checked="" type="checkbox"/> Sampling drums and containers
<input checked="" type="checkbox"/> Pressurized air cylinders	<input checked="" type="checkbox"/> Shipping and transport, 49 CFR 172.101
<input checked="" type="checkbox"/> Personal protective equipment, Sec. 5.0; 29 CFR 1910.120 g; 29 CFR 1910.134	<input checked="" type="checkbox"/> Tank and vault procedures (USTs)
<input checked="" type="checkbox"/> Respiratory protection, Sec. 5.2; 29 CFR 1910.120 g; 29 CFR 1910.134	<input checked="" type="checkbox"/> Illumination, 29 CFR 1910.120 m
	<input checked="" type="checkbox"/> Sanitation, 29 CFR 1910.120 n